

RADIOCARBON DATES
OF
Archaeological Sites in India

by
K. S. RAMACHANDRAN



During the past few decades archaeological excavations in the country have presented a vista of cultural heritage; a chrono-cultural sequence for reconstructing our past. This succession of cultural periods and phases so revealed is usually compressed in a framework of 'relative chronology', which is at once speculative and nebulous. But then the aim of the archaeologist or the historian in regard to chronology is somewhat different. His target is absolute dates; dates in hard figures.

Determining chronology on the basis of taxonomy is handicapped by the 'assumption that types evolved (or degenerated) regularly.' But taxonomy is the only alternative when, as Childe observes, 'where stratigraphical or geological evidence is lacking we must have recourse to typology.' Stratigraphy and the associate objects do help to evolve a relative chronology to a great extent. To extend this over a wide area is 'all hazardous business'; a mere 'guess work', and more often than not, wrong speculation. Therefore, a technique of absolute dating becomes imperative. For, in the absence of absolute dates 'cultures of different regions cannot accurately be compared, their ultimate inter-relationship cannot be assessed: in other words the vital causative factors of human 'progress' cannot be authoritatively reconstructed, and may be widely misunderstood.'

Recently physical and natural scientists have developed several dating methods viz., dendrochronology, thermoluminescence, archaeomagnetism, radiocarbon or C 14 method of dating, etc. Of these, dendrochronology was the earliest to be developed and successfully utilized in dating the American prehistory (pre-sixteenth century). But this method is cumbersome and involves building up a library of dated samples for comparison and to arrive at a date. Thermoluminescence and archaeomagnetism present serious handicaps and, under the present stage of knowledge, cannot be used with much advantage. In the circumstances, till a better system is evolved, the most acceptable technique is the Radiocarbon method developed by Willard F. Libby. This method, a product of atomic research, has to a greater extent enabled the archaeologist in building a chronological framework(s). However, it should not be assumed that this is the panacea for all the ills of archaeological dating, for this too, has certain drawbacks. Thus, while it has helped us in providing dates for prehistoric cultures to a large degree, it has not been an infallible method for determining the chronology of the historical periods for which written records are plentiful and are reliable. This is particularly true in case of Indian archaeology. The unsurmountable handicap in such cases have been the relatively large margin of error within which the actual date might vary. For example, if a sample from a known historical context gives a date 100 ± 100 B.C., then it has to be surmised that the actual date might be anywhere between 200 B.C. and A.D. 100; in the absence of corroborative internal evidence C 14 determination proves to be less useful. Nevertheless, under the present circumstances, by a judicious combination of stratigraphical and geological evidence we can arrive at a reasonably acceptable date by this method.

In the present compilation all the available data pertaining to the C 14 dates of various sites in India have been given; the intention being to present in one place the chronological framework of all the sites for which C 14 dates were published in various journals from time to time. Besides, the cultural

sequence of each site recounted here would, doubtless, be an added advantage facilitating intercomparison of cultures of different sites and regions. A short account of radiocarbon dating method is also appended.

The present work thus covers the vast temporal and spatial cultural framework as available from seventy-four sites. Some of the earliest dates of cultures represented here are: (i) Late Stone Age at Sarai Jahar Rai (ii) neolithic at Kodekal (iii) pre-Harappan and Harappan at Kalibangan (iv) P.G.W. levels at Noh and (v) N.B.P. levels at Kausambi and Rajghat respectively.

The sites have been arranged alphabetically and the dates are given in a descending order. Two dates are given, one of which is in parenthesis; B.P. after the parenthesis denotes Before Present. The first is based on half-life value of radioactive carbon worked out to 5568 ± 30 while the latter within brackets is 5730 ± 40 . The reduced dates in B.C./A.D. scale is also given. In this process, as stipulated by the laboratories, 1950 has been reckoned as the base year. For intercomparison of dates it is essential that constancy in the half-life value of radiocarbon between the sets of comparable dates should be maintained: in other words a set of dates based on half-life value of 5568 ± 30 should be compared with another set based on the same half-life. Yet another dictum is that the dates should not be considered independent of their standard deviation.

Most of the dates are those of samples measured by the Tata Institute of Fundamental Research, Bombay (now Physical Research Laboratory, Ahmadabad); samples run by other laboratories are also included. Each date is prefixed with the code name of the laboratory and a serial number. The code letters are abbreviations of: (i) BM=Research Laboratory, British Museum, London, U.K.; (ii) P=Department of Physics, University of Pennsylvania, Pennsylvania, USA; (iii) TF=Tata Institute of Fundamental Research, Bombay, India; (iv) U=Institute of Physics, University of Uppsala, Uppsala Sweden; and (v) JCLA=Institute of Geophysics, University of California, Los Angeles, USA. The materials for this compilation are derived from various works, viz., *Ancient India*, Bulletin of the Archaeological Survey of India New Delhi; *Current Science*, Bangalore; *Indian Archaeology - A Review*, New Delhi and *Radiocarbon*.

I am beholden to the Director General, Archaeological Survey of India, New Delhi, to Dr. D.P. Agrawal of the Physical Research Laboratory, Ahmadabad and to the various excavators whose Reports have enabled me to complete the task. To Dr. R. Subrahmanyam I am obliged for many suggestions. B.B. Datta was kind enough to prepare the typescript; to him my thanks are due. Lastly, I am extremely grateful to the Government of Andhra Pradesh and to Dr. N. Ramesan, Director of Archaeology and Museums A.P. in particular for undertaking the publication of this work.

RADIOCARBON DATES OF ARCHAEOLOGICAL SITES IN INDIA

I

Site : ADAMGARH

Lat : 22°43' N

District : Hoshangabad

Long : 77° 44' E

State : Madhya Pradesh

Excavation was conducted by the Archaeological Survey of India.

In all eighteen trenches, numbering ADG 1 to 18, were laid both under the rock-shelters and in the open as well.

In the trenches in the open three layers were encountered; the first two of which did not yield anything noteworthy. In layer 3, composed of black clay, numerous microliths and raw materials were found. The tool types were simple backed and edged blades, lunates, points, awls and a few burins. A few potsherds and bone pieces were also found in the upper level. The black soil seems to have been wind-blown and was formed during the occupation of the microlith-making people. Raw materials used in fashioning the tools were chert, jasper, agate, chalcedony, etc. This would imply local manufacture of the tools.

Digging within the rock-shelters revealed two cultural strata ; the lowest palaeolithic, in a layer of red clay while the later, microlithic in a stratum of black or brown soil. Tool-types in the Palaeolithic industry were handaxes, cleavers, ovates, discoids, scrapers, flakes and cores exhibiting Acheulian traits and were made at the site itself.

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- (1) TF-120 Microlithic phase shells from
Rock-shelter. Trench ADG-10; layer 2,
depth 0.15.21 m., Field No. X.
Current Science, 36, 21, 1967, pp. 566-68
and *Radiocarbon*, 10, 1968, pp. 131-43.

7240 $\pm$ 125 (7450 $\pm$ 130) B.P.
5500 $\pm$ 130 B.C.

- (2) TF-16 Uncharred bones from
 Rock shelter. Trench ADG-2,
 Layer 3, depth 1.90 m. Field no. II.
Current Science, 36, 21, 1967, pp. 566-68
 and *Radiocarbon*, 10, 1968, pp. 131-43

2765 $\pm$ 105 (2845 $\pm$ 105) B.P.
 1995 $\pm$ 105 B.C.

II

Site : ADICHCHANALLUR

Lat : 8° 37' N

District : Tirunelveli

Long : 77° 53' E

State : Tamilnadu

The site was explored and excavated over many years variously by Dr. Jagor of the Berlin Museum fur Volkerkunde (incidentally also discovered by him), M. Louis Lapidique of Paris and A. Rea of the Archaeological Survey of India.

The site situated on the right bank of Tamraparani in a wasteland unsuitable for cultivation is an urn-burial site of the megalithic-complex and covers an area of 114 acres (46.1 Hectares). The urns, usually single or in rare instances in pairs, were interred in adequate pits dug into solid rock or in gravelly soil. Sometimes the burials were marked by a heap of cairns.

Skeletal remains found inside the urns were post-exhumated bones. Burial furnishings were both inside and outside the urns. Urns were mostly pyriform in shape.

Contents of the urns may be enumerated as follows :

Gold diadems with holes at the ends and sometimes incised with triangular and linear designs.

Bronze (75% copper, 23% tin and the rest other metals) objects, bowls, jars with lid, jars, sieve-cups, ring-stands, hollow plate, animal topped stands, finials, vase-stands, bells, anklets, bangles, rings, rods, beads, etc. Animals represented are antelope, cock, buffalo, dog, sheep or goat, tiger, elephant, flying birds, etc. Some of the bronze objects bore traces of cloth.

Iron objects found were arrow-and spearheads, swords, knives, daggers, tripods, hoes, etc., mostly of the megalithic-complex. Some of the weapons showed evidence of being hafted to wooden handles.

Pottery consisted of the usual megalithic wares viz., Black-and-red, black and red wares. Some of the Black-and-red Ware pots bore paintings in white pigment ;
 RD-2x

designs being mainly short dotted lines diagonally around the rim. Beads of Carnelian both plain and etched were also found.

Many vessels contained vestiges of rice and millet.

TF 70 Megalithic (?) wood,
said to be associated with urn-burials.
Current Science, 33, 2, 1964, pp. 40-42 and
Radiocarbon, 6, 1964, pp. 226-32

775 $\pm$ 95 (795 $\pm$ 95) BP
1155 A.D.

Date is not acceptable because of wide variation from archaeologically estimated date.

III

Site : AHAR

Lat : 24° 40' N

District : Udaipur

Lang : 73° 50' E

State : Rajasthan

Excavated jointly by the Deccan College and Post Graduate Research Institute, Pune, the Department of Archaeology and Museums, Rajasthan and the University of Melbourne, Australia.

The mound is situated on the bank of the river of the same name and lies on the outskirts of Udaipur city.

Excavations revealed mainly two cultures, proto-historic and early historic with three sub-phases in each period.

Period I – Protohistoric : The ceramic contents of the period consisted mainly of two wares viz., red and grey. Besides buff, and buff slipped, cream slipped, burnished and unburnished grey black-and-red Wares were also present. Shapes in phase Ia were globular high necked vessels, small bowls, *lota*-like vessels; in phase Ib new shapes viz., carinated convex deep bowls, bowls with straight sides, globular pots, stepped dishes, bowl-on-stands with plain, corrugated and hollow stems; and in phase Ic further new shapes consisted of carinated and rimless bowls, dish-on-stand, etc. Paintings in black pigment and graffiti marks were also observed. Shapes in grey ware comprised dish or basin, *lota*-like vessels, storage jars with rusticated lower portions, pans, lugged bowls, etc.; the last suggesting foreign influence. The black-and-red ware comprised several varieties viz., plain, with both or either of the surfaces burnished, with matt surface painted and with gritty core. Shapes were predominantly bows, pots, shallow pans,

bowl-on-stand, etc. Painted designs comprised mostly of dots and lines, wavy lines, diamonds and rarely spirals. Decorations on other wares were applique, cut, incised, punctured, etc., besides painted designs. Decorations were confined to shoulder portion. Designs were concentric horizontal bands, bands enclosing vertical chevrons, etc.

Other antiquities in phase Ia consisted of beads of faience, schist and terracotta; ear-studs of terracotta, bangles of terracotta and copper; stone balls, rubber stones, hammer-stones, saddle querns; bone points and pins; in phase Ib besides, those found in phase Ia, beads of agate, bone, carnelian jasper, shell; crucibles, skin rubber of animal figurines—bull, horse and elephant — human figurines, of terracotta; pendants, etc., rings and celts of copper, shell bangles; mullers and mace-heads, saddle querns, etc., and in phase Ic apart from those found in the preceding phase new ones were beads of glass and lapis lazuli, terracotta votive tanks; *khol* sticks of copper and bone. Noteworthy find was terracotta beads with incised decoration recalling parallels from Troy and Anau.

Structures of Period I were divisible into fifteen phases.

Houses were of stone and mud with schist foundation; walls were strengthened with bamboo screens or quartz pieces. Floors were made of baked clay mixed with yellow silt and occasionally with a bedding of blocks of cemented gravel. Houses were rectangular on plan.

Period I represents the Copper Age without any lithic artifacts. Rice was the cereal known to the people of Ahar in this period.

Period II : Pottery of the earlier period and the decoration-motifs disappear in this period. The wares pertaining to this period were as follows: a red ware with a wash, red slipped and coarse red, black painted red, coarse black ware, besides a black ware with mica coating in phase IIa; a red ware with or without wash, thin red slipped and limited sherds of micaceous grey and black-on-red ware in white pigment — a continuation of the earlier phase — in phase II b and a red ware with a wash, red slipped mica coated, blotchy black-and-grey ware in phase II c.

Other antiquities in each phase respectively were beads of terracotta, terracotta balls, shell bangles, bone points, rubber or stone beads of carnelian, terracotta; bone points, knife blades of copper, skin rubbers ear-studs, votive tanks, and bangles of terracotta; and beads of crystal, terracotta skin rubbers, ear studs, ball, bull, votive tanks of terracotta; rings of copper, arrow-heads, axe-adze of iron; glass bangles and saddle querns.

Rice and millet were known in this period.

RADIOCARBON DATES

- (1) V 57 Copper Age culture, Period I
Charcoal; Trench H, Layer 7,
depth 37 feet (11.27 m.) below datum.
Radiocarbon, 8, 1966, pp, 507 -21.

3975 $\pm$ 95 (4094 $\pm$ 98) B.P.
2144 $\pm$ 98 B.C.
- (2) V 58 Copper Age Culture, Period I
Charcoal; Trench J, Layer 10,
depth 41' (12.5 m.) below datum.
Radiocarbon, 8, 1966, pp. 507-21.

3890 $\pm$ 100 (3987 $\pm$ 103)B.P.
2037 $\pm$ 103 B.C.
- (3) V 54 Copper Age Culture, Period I
Charcoal from hearth; Trench I,
layer 9, depth 37' (11.27 m.)
below datum.
Radiocarbon, 8, 1966, pp. 507-21.

3835 $\pm$ 95 (3950 $\pm$ 98) B.P.
2000 $\pm$ 98 B.C.
- (4) V 55 Copper Age Culture, Period I
Decayed wicker work ;Trench K,
layer 11; depth 41ft., 6 in.
(12.46 m.) below datum
Radiocarbon, 8, 1966, pp. 507-21

3825 $\pm$ 120 (3940 $\pm$ 124) B.P.
1990 $\pm$ 124 B.C.
- (5) V 56 Copper Age Culture, Period I
Charcoal from hearth; Trench Y,
layer 8, depth 37feet (11.27 m.)
below datum
Radiocarbon, 8, 1966, pp. 507-521.

3715 $\pm$ 95 (3826 $\pm$ 98) B.P.
1876 $\pm$ 98 B.C.
- (6) TF 34 Copper Age Culture, Period I
Charcoal, Trench E, layer 7,
depth, 11.35 m. below datum,
Field no. 2533.
*The Proceedings of the Indian
Academy of Sciences*, LVIII, 3
Section A, 1963, pp. 141-52 and
Radiocarbon, 5, 1963, pp. 273-82.

3570 $\pm$ 135 (3675 $\pm$ 140) B.P.
1725 $\pm$ 140 B.C.
- (7) TF-32 Copper Age Culture, Period I
Charcoal with little mud,
Trench A, layer 5, depth 4.9 m.
below datum, Field no. 1038
*The Proceedings of the Indian Academy of
Sciences*, LVIII, 3, Section A, 1963, pp. 141-52
and *Radiocarbon*, 5, 1963, pp. 273.82.

3400 $\pm$ 105 (3500 $\pm$ 110) B.P.
1550 $\pm$ 110 B.C.

- (8) TF-37 Copper Age Culture, Period I
Charcoal with mud and dirt. 3165 $\pm$ 110 (3255 $\pm$ 115) B.P.
1305 $\pm$ 115 B.C.
Trench J, layer 8, depth 12.1 m.
below datum. Field no. 2590
The Proceedings of the Indian Academy of Sciences, LVIII, 3 Section A,
1963, pp. 141-52 and *Radiocarbon*, 5, 1963,
pp. 273-82.
- (9) TF-31 Copper Age, Culture Period I 3130 $\pm$ 105 (3220 $\pm$ 110) B.P.
Charcoal with mud. Trench X, layer 5, 1270 $\pm$ 110 B.C.
depth 1.98 m. below datum Field no. 2488
The Proceedings of the Indian Academy of Sciences,
LVIII, 3, Section A, 1963, pp. 141-52 and
Radiocarbon, 5. 1963, pp. 273-82.
- (10) TF-18 Late Medieval, Charcoal, with mud. 190 $\pm$ 90 (200 $\pm$ 95) B.P.
Trench H, layer 1, depth 0.15 m. 1750 $\pm$ 95 A.D.
below surface.
The Proceedings of the Indian Academy of Sciences,
LVIII, 3, Section A, 1963, pp. 141-52 and
Radiocarbon, 5, 1963, pp. 273-82.

IV

Site : AHICHCHHATRA

Lat. : 28° 22' N

District : Bareilly

Long. : 79° 07' E

State : Uttar Pradesh

Excavations conducted by the Archaeological Survey of India.

Excavations revealed four occupational periods.

Period I : This period is represented by a 60 cm. thick compact clayey soil and is distinguished by the occurrence of Ochre Coloured Pottery. The ware is red slipped but usually the slip is lost. It is generally thin; thick sherds are less frequent. The fabric is medium to fine. Shapes in the pottery include dish-on-stand with hollow stem, jars, bowls, basins, etc. Outer skin of the pottery was invariably peeled off.

- (8) TF-37 Copper Age Culture, Period I
Charcoal with mud and dirt. 3165 $\pm$ 110 (3255 $\pm$ 115) B.P.
Trench J, layer 8, depth 12.1 m. 1305 $\pm$ 115 B.C.
below datum. Field no. 2590
The Proceedings of the Indian Academy of Sciences, LVIII, 3 Section A,
1963, pp. 141-52 and *Radiocarbon*, 5, 1963,
pp. 273-82.
- (9) TF-31 Copper Age, Culture Period I 3130 $\pm$ 105 (3220 $\pm$ 110) B.P.
Charcoal with mud. Trench X, layer 5, 1270 $\pm$ 110 B.C.
depth 1.98 m. below datum Field no. 2488
The Proceedings of the Indian Academy of Sciences,
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Radiocarbon, 5, 1963, pp. 273-82.
- (10) TF-18 Late Medieval, Charcoal, with mud. 190 $\pm$ 90 (200 $\pm$ 95) B.P.
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- (2) TF-301 Early historical, Period III Charcoal 2255 $\pm$ 105 (2320 $\pm$ 105) B.P.
Locus CXIII-CXIV, layer 1, depth 0.8 m., 370 $\pm$ 105 B.C.
Field no. 2, Sample came from phase II of
defences from the debris overlying mud filling.
Current Science, 35, 11, 1966, pp. 276-78 and
Radiocarbon 8, 1966, pp. 442-52.
- (3) TF-317 P.G.W. deposits, Period II 2155 $\pm$ 100 (2200 $\pm$ 105) B.P.
Charcoal (from disturbed strata). 250 $\pm$ 105 B.C.
Locus : X-XI, layer 15, depth 3.4m.,
Field no. 214 (N.M.)
Current Science, 35, 11, 1966, pp. 276-78 and
Radiocarbon, 8, 1966, pp. 442-52.
Date is unreliable
- (4) TF-310 N.B.P. levels, Period III 2050 $\pm$ 90 (2110 $\pm$ 95) B.P.
Charcoal from high mound. Locus : XI-XII; 160 $\pm$ 95 B.C.
pit 4 sealed by layer 8A, depth 2.5 m.,
Field no. 117.
Current Science, 35, 1, 1966, pp. 4-5 and
Radiocarbon, 8, 1966, pp. 442-52
- (5) TF-296 Charcoal from high mound. 650 $\pm$ 95 (670 $\pm$ 98) B.P.
Locus VIII'-IX' layer 15, depth 0.31 m, 1280 $\pm$ 98 A.D.
Sample no. 24, Field no. 194 (H.M.)
Radiocarbon, 10, 1968, pp. 131-43.
Date is not acceptable

V

Site : ALAMGIRPUR

Lat : 30° 45' N

District : Meerut

Long : 75° 50' E

State : Uttar Pradesh

Excavated by the Archaeological Survey of India.

In all four periods, Harappan, Painted Grey Ware, early historical and late medieval, with break after each period, were distinguished.

Period I : Harappan - Late Phase: The total deposit assigned to this period is about 6 feet (1.8 m.) thick.

Shapes in pottery comprised dish-on-stand, goblet, dish, cylindrical vase, beaker, perforated jar, etc. The paintings, as usual, were in black pigment over a red slip. Design repertoire consisted of simple bands, triangles, squares, intersecting circles, peacock plants, hatchings parallel or criss-cross and occasional block designs.

Particular mention may be made of cloth impression on a trough. The yarn seems to be fairly fine, though not uniform, and the cloth was of a plain weave.

Other finds included cakes, carts, cubical dice, beads and bangles of terracotta; bangles of faience; beads of steatite and semi-precious stones; and pins and broken blade of copper/bronze.

Period II : (P.G.W. levels) : Average thickness of cultural deposit of this level was about $4\frac{1}{2}$ feet (1.37 m.)

Pottery consisted of P.G., black-and-red, and plain red Wares. Shapes were bowls, dishes, in the first three and incurved dishes, basin and storage jars in the last.

Other finds included two wheeled terracotta toys-ram and bull; semi-circular grey ware objects with its convex sides meeting at the apex and the inner hollow divided into two portions; objects of copper; spear-heads, barbed arrow-heads, nails or pins of iron: dice, styli and arrow-heads of bone; reel shaped discs of black jasper, vitreous paste and bone and beads of glass.

Structural remains were fragmentary mud-walls at top levels.

Period III : (early historical) : Thickness of deposit was less than a foot (0.3 m.) and was confined to limited areas.

Shapes in pottery included jars, cooking basins, bowls and vases.

Though no structures were encountered, burnt bricks and an unlined soakage-well were noticed.

Period IV (Late 17th cent. or early 18th cent.) : Shapes in pottery comprised large bowl, spouted jar, carinated *handi*, miniature lamp, lid, etc.

A wall and a floor made of *lakhauri* bricks were the structural remains of the period.

TF-51 Painted Grey Ware levels, Period II
Bones

1060 ± 95 (1090 ± 100) B.P.
 860 ± 100 A.D.

Current Science, 33, 2, 1964 pp. 40-42 and
Radiocarbon, 6, 1964, pp. 226-32.

The date is very much divergent from archaeological estimation from other known sites; hence not acceptable.

VI

Site : AMBARI

District : Kamrup

State : Assam

Excavated jointly by the Department of Anthropology, University of Gauhati, the State Department of Archaeology and the Deccan College and Post Graduate Research Institute, Pune.

During the salvage operations five layers were encountered; their description being as follows:

(i) dark grey earth mixed with modern debris, (ii) light brown earth with sculptures, (iii) compact brown earth with pottery, pebbles, hearths, etc. (iv) brownish grey earth with pottery and (v) dark grey earth, brick-bats, pottery, etc. Natural soil was not reached.

Ceramics, though unrelated stratigraphically, consisted of kaolin white, buff, red, grey and dark grey to black Wares. Almost all of them were wheel-turned. Chinese celadon, a local glazed ware assignable to 12-13 century A.D. were also recovered. From the lower levels shallow dish with flared rim was found. Stamped designs were rosettes, diamonds etc.

Other finds included cornucopia shaped lamp-stand, beads and bangles of terracotta and glass, terracotta figurines, iron arrow-head, rings of copper and copper coin of the East India Company.

Over 40 sculptures were obtained. These represent forms of Vishnu, Surya, Nandi, Agni with his consorts, lingas, yonis; stylistically these are datable to 9-10 century A.D.

Building vestiges were a 24.35 m. long brick structure, an apsidal structure 50 cm. thick, the inner side of which had brick-on-edge facing, tiles, drain pipes, etc.

Subsequently, two trenches AMB-I and AMB-II were laid, where due to high water-table natural soil was not reached.

On the basis of pottery four phases were recognised:

Phase I where the lid forms exhibited similarities with those from Sisupalgarh—early Christian era; phase 2 contained bowls, vases, etc. of red, grey buff and kaolin wares, with occasional stampings and rustications; in phase 3 the major ware was the kaolin ware in which bowl and the *lota* were the representative types; and in phase 4 occur medieval glazed wares. Other finds were female torso terracotta (phase 3); and terracotta lingas. Notable stone sculpture is a ten-armed Siva dancing on the back of a bull.

TF 1019 Phase III
Charcoal
Trench AGXI-2161, layer 3, depth 1.2 m.
IA 1970-71 (cyclostyled)

895 $\pm$ 105 (920 $\pm$ 105) B.P.
1030 $\pm$ 105 A.D.

VII

Site : ATRANJIKHERA

Lat : 27° 42' N

District : Etah

Long : 78° 44' E

State : Uttar Pradesh

Excavated by the Aligarh Muslim University, Aligarh.

In all seven Cultural periods were observed.

Period I (middle of the 2nd millennium B.C.) : In the one metre thick deposit overlying the natural soil the earliest period began and is represented by the occurrence of the O.C.P. The pottery is wheel-made and traces of red slip is observable. Some of the sherds bore decorations; the designs being notches, parallel and wavy lines. Shapes in pottery consisted of dish-on-stand, pedestalled and miniature bowls, handles of different shapes, channel-like spout, deep basin bowls, large vessels, vases, etc. Special features observed on pottery at this site were the incised decorations such as lines on applied chords, dishes, deep dots and notches arranged in straight, oblique and angular or wavy lines.

A horizontal band of rammed earth mixed with *kankar* and potsherds divides the deposit into two.

Other antiquities were sandstone pieces and beads. The deposit did not show any regular habitation. Soil analysis showed the area was under water logged state for a long time.

A few burnt brick bats were also found.

Break in occupation after this period was noticed.

Period II (Later half of 2nd millennium B.C.) : This period is distinguished by the appearance of black-and-red Ware. On the northern side of the mound this ware was found interspersed between O.C.P. and P.G.W. while on the southern side this was found on the natural soil. The black-and-red Ware found here shows affinities in fabric with that from Ahar and Gilund.

Other ceramics were the black slipped, grey and red Wares; both slipped and plain variety in the last. Shapes included vase, bowl, basin, dish, miniature bowl, etc; some of the bowls bore painted designs.

Minor finds included beads of shell and carnelian; ear-rings of copper; comb of bone; microliths consisting of flakes, cores on chalcedony and agate showing ripple flaking.

Period III (c. 1200-600 B.C.) : This period is characterised by the appearance of the Painted Grey Ware. Other Wares consisted of plain grey, black-and-red, black slipped and red Wares.

Other finds were arrow, spear-heads knives, chisels, etc., of iron; styluses, gamesmen, beads and knitting needles of bone; beads, discs with designs, net sinkers of terracotta; and beads of semi-precious stones, etc.

Three structural phases and five floor levels were encountered. Hearths, circular fire pits were indicative of habitational activities.

A pottery kiln with pots *in situ* was an important discovery.

Period IV (600-200 B.C.) : The ceramic contents of this period consisted of the NBP and its associated Wares, black slipped and fine grey wares. An overlap between Periods III and IV was observed.

An interesting feature in this period was the discovery of terracottas ascribable to the Sunga period.

Other finds included a tiny bird of bone, miniature vase of copper, iron hoe, etc.

Structural remains were ring-wells, silo of mud brick, mud and burnt brick walls. Two phases in structural activities were discerned. In the earlier phase burnt mud clods with bamboo and reed-marks were found. In the latter remains of mud-walls, baked brick structures and plaster were found.

Period V (c. 200 B.C.–300 A.D.): A red ware of medium fabric datable to the early centuries of the Christian era was the dominant pottery of the period.

Other antiquities comprised of animal and human figurines of terracotta, beads, etc., of terracotta, besides, characteristic objects of the period.

The structures were of burnt bricks and in conjunction with those of the earlier period.

Period VI (600–1200 A.D.): After a lapse of some centuries habitation began once again at this site. Pottery and other objects were typical of the early medieval period.

Period VII is actually a continuation of the earlier period and is marked by the appearance of glazed Ware of sandy, friable fabric with floral and geometric designs.

In the protohistoric period habitation was mainly confined to the eastern part of the mound. In the north-western periphery of the mound occupation began in early historical times.

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| (1) | TF-191 P.G.W. early levels, Period III
Charcoal with earth. Trench ARJ/4-D1,
layer 6, depth 3.2 m.
<i>Current Science</i> , 33, 9, 1964, pp. 266–69, and
<i>Radiocarbon</i> , 7, 1965, pp. 291–95. | 2890 $\pm$ 105 (2975 $\pm$ 110) B.P.
1025 $\pm$ 110 B.C. |
| (2) | TF-415 Black- and-red ware levels, Period II
Charcoal. Baulk between Trenches E1 and E2,
layer 8, depth 0.5m.
Field no. 3/1965
<i>Radiocarbon</i> , 11, 1, 1969, pp. 188–93. | 2450 $\pm$ 200 (2523 $\pm$ 200) B.P.
573 $\pm$ 200 B.C. |
| (3) | TF-291 P.G.W.–late levels, Period III
Charcoal. Trench ARJ4-D1 (SE), layer 6,
depth 2.50 m. Field no. 4/64–9.
<i>Current Science</i> , 35, 1, 1966, pp. 4–5 and
<i>Radiocarbon</i> , 8, 1966, pp. 442–52. | 2415 $\pm$ 100 (2485 $\pm$ 100) B.P.
535 $\pm$ 100 B.C. |

- (4) TF-194 N.B.P. Ware levels, Period IV, 2410 $\pm$ 85 (2485 $\pm$ 100) B.P.
Charcoal. Trench ARJ4, A1 (NW), layer 16, 535 $\pm$ 100 B.C.
depth 3.1 m
Current Science, 35, 1, 1966, pp. 4-5.
- (5) TF-284 N.B.P. ware levels, period IV, 2180 $\pm$ 95 (2245 $\pm$ 100) B.P.
Charcoal. Trench ARJ4, A1 (SW), layer 29, 295 $\pm$ 100 B.C.
depth 5 m. Field no. ARJ4/62-2
Current Science, 35, 1, 1966, pp. 4-5 and
Radiocarbon, 8, 1966, pp. 442-52.

VIII

Site : BAGOR

Lat : 25° 22' N

District : Bhilwara

Long : 74° 26' E

State : Rajasthan

Site was excavated by the Deccan College and Post Graduate Research Institute, Pune and the Department of Archaeology and Museums, Rajasthan.

Occupation debris was 1.70 m. thick. Excavation revealed three cultural phases.

Phase I was characterized by microliths which were typologically uniform and of evolved geometric forms. Tool-types were blunted backed blades, obliquely blunted blades, lunates, triangles, mainly scalene and a few isoceles—*petit tranchet* or transverse arrow-heads, trapezes and points. Flake and core tools were rare. Microliths were of chert and occasionally of chalcedony. Retouch and use-marks were noticed. Animal bones were also recovered in good quantity. Structural remains were stone paved floors, stone-alignments indicating circular huts. In the lower levels bones of small animals were seen. Structures too, in lower level, were less. In the upper levels of this phase successive floor-levels with lots of charred and uncharred bones were found. A few diminutive potsherds, probably percolated from above were also observed. Exception is a handmade pot with two holes in the neck. This is perhaps associated with a burial of Phase II. This phase was about 50-80 cm. thick.

From a trench elsewhere nearly 1.5 lakhs of stone tools were recovered. Associated with animal bones were found hammerstones, small shallow quern and rubbing stones. Besides, beads of agate and garnet were also found.

In this phase habitation seems to be seasonal which subsequently transformed into sedimentary.

Phase II is distinguished by the appearance of metal tools and the use of pottery. Microliths continued to be used but in a decreasing number.

Barring a few, the pots were all handmade. Pottery was mainly dull brown in colour with smoky core, gritty and slipped. Representative shapes were round bottomed bowls, large shallow dishes, small broad mouthed *handis*. Decoration on pottery comprised incised linear and geometric patterns. Uniformly oxidized red ware represented by bowls and dishes was also found in lesser frequency. Other finds included stone hammers, rubbers, saddle querns, sling balls, hour-glass sectioned mace-heads, beads of carnelian and banded agate and occasionally of bones.

Structural vestiges were several paved floors and circular huts.

Pertaining to this phase were three human burials; one of which was oriented east-west while the other two south-east-north-west. The body lay in a supine position with legs and hands folded in a flexed posture. The first burial contained eight pots in two groups at the head and feet. In the second one attendant furnishings comprised four pots near the feet, copper arrow and spear-head near the head, copper awl on the stomach, necklace of carnelian and agate beads and plano-convex terracotta spindle whorl bead with punctured triangular decorations. The third burial contained a single pot over the head. In the first two interments animal bones were also found.

The third phase at this site saw the introduction of iron. Pottery was mainly wheel-thrown. Mostly it was a red micaceous and slipped ware. However, dull brown ware of the earlier phase continued. Shapes were bowls, carinated dishes and *handis*. The frequency of microliths declined sharply.

Other finds consisted of stone hammers, rubbers, saddle querns, heads of semi-precious stones and glass.

Structural remains were floors paved with schist slabs and semi-circular buildings. The use of kiln burnt bricks of pavements was also attested.

An extended burial of this phase shows a grave covered with small stones and brick bats. The body was in supine posture oriented north-south. No other furnishings were seen. In this culture there was, however, no direct evidence of agriculture or even of stock raising.

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| (1) | TF-787 Bagor Culture. Charred Bones
Trench E IV, layer 2,
depth 1.7-1.26 m. Field no. BGR-5
<i>Indian Archaeology</i> 1969-70—A Review, p. 67 | 6245 $\pm$ 200 (6430 $\pm$ 200) B.P.
4480 $\pm$ 200 B.C. |
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- (2) TF-1007 Bagor Culture. Charred bones
Trench, E I, depth 0.99-1.10 m.
Field no. BGR 1968-9, EI-4.
Indian Archaeology 1969-70—*A Review*, p. 67.
5620 $\pm$ 125 (5785 $\pm$ 130) B.P.
3835 $\pm$ 130 B.C.
- (3) TF-1012 Bagor Culture. Charred bones
Trench G V, depth 1.31-1.40 m.
Field no. BGR 1968-69, GV-19.
Indian Archaeology 1969-70—*A Review*, p. 67.
5090 $\pm$ 85 (5235 $\pm$ 90) B.P.
3285 $\pm$ 90 B.C.
- (4) TF-1009 Bagor Culture. Charred bones
Trench G III, depth 0.89-0.98 m.
Field no. BGR 1968-69, G III-12
Indian Archaeology 1969-70—*A Review*, p. 67.
4585 $\pm$ 105 (4715 $\pm$ 105) B.P.
2765 $\pm$ 105 B.C.
- (5) TF-1005 } Bagor Culture
TF-1006 }
Charred bones
Trench E II, depth 0.73-0.88 m.
Field no. BGR 1968-69, E II, 5-6
Indian Archaeology 1968-69—*A Review*, p. 67.
3945 $\pm$ 90 (4060 $\pm$ 90) B.P.
2110 $\pm$ 90 B.C.

IX

Site : BARUDIH

Lat : 22° 20' N

District : Singhbhum

Long : 86° 00' E

State : Bihar

Excavated by the Department of Anthropology, University of Calcutta.

Stratigraphy at this site can be summarised as below :

Layer 1 – a thin layer of reddish brown soil

Layer 2 – Compact dull-black implementiferous soil, and

Layer 3 – a thick accumulation of archaeologically sterile red soil

At places microliths were found in layer 3. In layer 2 stone axes and adze, mostly chipped, smoothed and round butted, were found between 40 cm. and 90 cm.

from the surface. Other finds were potsherds, fragmentary animal bones and burnt earth. Charcoal and potsherds were found throughout this layer. Pottery comprised grey, orange-brown and black Wares; both hand-made and wheel-thrown. No distribution pattern was, however, observed. Bowls and dishes were the shapes.

- (1) TF-1100 Neolithic Culture. Carbonaceous clay 2920 ± 200 (3005 ± 210) B.P.
Locus : N-S 29.5-56 cm.-E-W.12.5-37.5 cm., 1055 ± 210 B.C.
depth 91.3 cm. Sample no. 3, accession no.144.
- (2) TF-1099 Neolithic Culture. Carbonaceous clay 2625 ± 105 (2700 ± 110) B.P.
Locus: N-S. 68 cm. —E.W. 44.5 cm. 750 ± 110 B.C.
depth, 74 cm. Sample no. 2, accession no. 141.
- (3) TF-1102 Neolithic Culture. Carbonaceous clay 2540 ± 90 (2610 ± 90) B.P.
Locus: N-S. 31.5-57.5 cm.-EW-62-89.5 cm. 660 ± 90 B.C.
depth 94.3 cm. Sample no. 5, accession no. 147
- (4) TF-1101 Neolithic Culture. Carbonaceous clay 2475 ± 85 (2545 ± 90) B.P.
Locus: N-S. 38 cm.-E.W. 59.5 cm. 595 ± 90 B.C.
depth 104-114 cm. Sample no. 4,
accession no. 152.

Along with sample no. 5 (TF-1102) a neolith was also found.

X

Site : BEDSA

Lat : $18^{\circ} 46' N$

District : Poona

Long : $73^{\circ} 48' E$

State : Maharashtra

General : The Buddhist caves of Karle, Bhaja and Bedsa are situated in the Bhore Ghat. The caves at Bhaja, Bedsa and Karle are in the 'spurs that strike out from the hills into the table land.' These are isolated groups and comprise mainly of a *chaitya* cave, *viharas* and some detached cells. The prominent feature among these is the *chaitya*.

The rock-cut caves fall within a time bracket of 250 B.C.—A.D. 100.

The caves are situated five and half miles (8.84 km.) east of Bhaja and four and half miles (7.23 km.) south of Karla. This is also known as Karanj-Bedsa. The caves form the smallest of the groups consisting of *chaitya* cave and *viharas*.

BM-155 Wood

Locus: ornamental roof-beam of *chaitya* cave.
Radiocarbon, 10, 1, 1968, pp. 1-7.

2010 $\pm$ 150 (2070 $\pm$ 155) B.P.
 120 $\pm$ 155 B.C.

XI

Site : BESNAGAR

Lat : 23° 32' N

District : Vidisha

Long : 77° 48' E

State : Madhya Pradesh

Excavated by the Archaeological Survey of India.

Three cuttings BSN-1 to BSN-3 were made.

Excavations revealed six cultural periods: from pre-NBP to post-Gupta times.

Period I : Chalcolithic phase: Ceramic contents were black painted red ware, black-and-red ware, black slipped and plain red wares. Besides, a few sherds of grey ware, undoubtedly of the fabric PGW were also found from the upper levels.

Other objects included objects of iron, microliths—mostly short blades on crystalline quartz.

Period II : This period is characterized by the appearance of the NBP. Other wares of the earlier period, however, continued. But plain red was the dominant ceramic.

Other finds consisted of various types of iron objects, beads, flesh rubbers and votive tanks of terracotta; bone objects, pestles and querns of stone; collared copper bead; votive stone linga; punch-marked coins, etc.

Structural remains were a high brick wall and ring-wells.

The period came to an end due to conflagration.

Period III : Pottery consisted of plain red, black-and-red and kaolin wares.

Other antiquities were marble objects; shell bangles, punch-marked coins; terracotta beads, pestles and querns of stone; polished and burnt bone pieces; and an inscribed stone seal from the late levels bore the legend *nikhumba-ragasya* in Brahmi characters of the Sunga period.

Period IV : Naga-Kushana period : Pottery consisted of a red ware, sometimes painted in black and red slipped Ware. Sprinklers appear on the scene.

Other objects included votive tanks, beads, ear-studs, gamesmen and flesh rubbers of terracotta and copper coins.

Period V : Gupta: In pottery the earlier painted tradition continued, though in a limited quantity. Incised, stamped and impressed decorative motifs on pottery were frequent.

Other finds included bottle stopper, human and animal figurines, stamps and bangles of terracotta; incised bangles of shell; silver coins, etc.

Structural remains comprised of a ritualistic circular pavement.

Period VI : After a lapse of some centuries this period commences. Pottery comprised of painted grey and plain red wares.

Finds from this period consisted of copper coins, fragment of stone sculpture; beads, circular discs or weights of terracotta. A find of particular interest was a dozen pots containing animal bones enclosed by rubble walls.

A massive rubble masonry, perhaps a defence wall was another discovery.

Excavations revealed plan of elliptical temple (3rd century B.C.) with *pradakshina patha*, with later phase of brick platform raised on plinth retained by free built rubble walls. This temple was earlier than the Heliodorous pillar.

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| (1) | TF-387 N.B.P. Ware levels, Period II
Charcoal Trench BSN 4, G I, layer 8,
depth 3.00 – 3.15 m., Field no. 1850.
<i>Current Science</i> . 35, 11, 1966, pp. 276–78 and
<i>Radiocarbon</i> , 10, 1968, pp. 131–43. | 2350 $\pm$ 100 (2420 $\pm$ 105) B.P .
470 $\pm$ 105 B.C. |
| (2) | TF-254 N.B.P. Ware levels,
early phase, Period II. Charcoal
Trench BSN-1, layer 8,
depth 2.70 m. Field no. BSN-1/GI/C/64-2
<i>Current Science</i> , 34, 13, 1965, pp. 394–97 and
<i>Radiocarbon</i> , 8, 1966, pp. 442–52. | 2180 $\pm$ 105 (2245 $\pm$ 110) B.P.
295 $\pm$ 110 B.C. |

XII

Site : BHAINSAUR

District : Mirzapur

Lat : 24° 46' N

Long : 82° 09' E

Excavated by the University, Allahabad.

The site is an open-air habitation site. Three trenches, one in the open air at Bhainsaur and two, one each, in the rock-shelters at Baghai-khor and Morahna Pahar were laid.

A trench measuring 3×1.5 m. was laid revealing a 91 cm. thick deposit. Six layers were encountered and their contents are as follows.

Layer 1 and 2 yielded both geometrical and non-geometrical microliths and some pottery.

Layer 3 and 4 yielded geometric microliths and pottery, surface of which was ochrish-red and greyish section.

Layer 5 was devoid of pottery and contained non-geometric microliths.

Layer 5A – natural soil

The layers indicate a dry condition with sparse vegetation.

Thus, we have here three phases viz. non-pottery non-geometric microlithic; pottery plus geometric microlithic and a phase combining the materials of both.

A trench measuring 3.65×1.80 m. and 60 cm. deep in the Rock-shelter at Baghai-khor revealed four layers. Finds from these are as follows:

Layer 1 yielded microliths, pottery of earlier period mingled with those of later and iron objects, including an iron arrow-head. Layers 2 and 3 yielded a number of microliths and pottery. Layer 4 yielded only non-geometrical microliths; pottery was absent.

An extended human burial in a pit oriented east-west and cut into layers 3 and 4 and partly into the cave floor was observed. A later pit has disturbed the burial damaging the skull.

A trench measuring 1.80×1.20 m. and 0.60 m. deep in the Rock-shelter at Morahna-Pahar revealed four layers yielding geometrical microliths and pottery. An interesting find is an arrow-head of iron.

TF-187

Charcoal from rock-shelter at Baghai-khor

Locus: BGK, Trench 3, 2-3, pit A

sealed by layer, 1, depth 0.1 m.

Field no. BGK(M)-63/3001.

Current Science, 35,11, 1966, pp. 276-78 and

Radiocarbon, 8, 1966, pp. 442-52.

270 $\pm$ 120 (280 $\pm$ 125) B.P.

1670 $\pm$ 125 A.D.

TF-188

Charcoal from rock-shelter at Morahna-Pahar

Trench MRA, 1-2, pit A sealed by layer 1.

depth 0.09 m. Field no. MRA(M) 63/3002

Current Science, 35, 11, 1966, pp. 276-78. and

Radiocarbon, 8, 1966, pp. 442-52.

1530 $\pm$ 95 (1575 $\pm$ 95) B.P.

375 $\pm$ 95 A.D

Dates are not consistent with archaeological estimation.

XIII

Site : BHAJA

Lat : 18° 44' N

District: Pune

Long : 79° 23' E

State : Maharashtra

General : The Buddhist caves of Karle, Bhaja and Bedsa are situated in the Bhore Ghat. The caves at Bhaja, Bedsa and Karle are in the 'spurs that strike out from the hills into the table land'. These are isolated groups and comprise mainly of a *chaitya* cave, *viharas* and some detached cells. The prominent feature among these is the *chaitya*.

The rock-cut caves fall within a time bracket of 250 B.C.-A.D.100.

Bhaja caves are to be found two miles (3.2 km.) south of Karle village at the foot of the hill over which the Isapur fort is built.

Here the *chaitya* cave (cave XII) is important and interesting. The architectural features reveal that this is based on wooden prototype. Again 'there is not one feature nor one detail which is not essentially wooden throughout.'

- (1) TF-170 Wood 350 $\pm$ 115 (360 $\pm$ 115) B.P.
1590 $\pm$ 115 A.D.
Locus: From support of an arched roof
Current Science, 34, 13, 1965, pp. 394-97 and
Radiocarbon 8, 1966, pp. 442-52.
- (2) TF-245 Wood 75 $\pm$ 90 (77 $\pm$ 92) B.P.
1873 $\pm$ 92 A.D.
Locus: from rock-cut cave Field no. AR 11
Current Science, 35, 11, 1966, pp. 276-78
and *Radiocarbon*, 8, 1966, pp. 442-52.
Dates are inconsistent. Perhaps indicate a later
repair work.

XIV

Site : BHITARI

Lat : 25° 35' N

District : Ghazipur

Long : 83° 17' E

State : Uttar Pradesh

Excavated by the Department of Ancient History, Culture and Archaeology,
Banaras Hindu University, Varanasi.

Digging in the area approximately 300 m. to the north of the pillar revealed vestiges of square temple, the corners of which on the outside were doubly recessed giving rise to neat projections on three sides showing the *triratha* plan of the temple. This is very much similar to the Bhitragan temple. The walls of the temple were unusually wide indicative of another storey or at least a *sikhara* for superstructure. Subsequently a square pavilion was added to the temple. To the temple, originally a square, extensions were made on the east to make it a rectangle. Remains of massive plinth were also exposed. A stone paved floor believed to be a *pradakshinapatha* was unearthed. But its specific use is not clear. A few walls anterior to the pavement were also brought to light suggesting that these were of pre-Gupta date. But building activities around the Skandagupta pillar commenced only in Gupta times. The earlier structures were decorated with terracotta panels. But later, large scale use of stone is attested.

Finds viz., pottery, terracotta tiles, shell bangles, etc., belonged to the Gupta period. Worth noting are the inscribed bricks bearing the legend *Srikumaragupta*, moulded bricks, terracotta panels and a well-preserved relief of sand-stone depicting Yasoda receiving child Krishna from Vasudeva.

TF-989 Charcoal
Trench BTR-2, AO, depth 3.8 m.
Field no. BTR-2
Indian Archaeology 1969-70- *A Review*, p. 68.

1620 $\pm$ 90 (1665 $\pm$ 90) B.P.
285 $\pm$ 90 A.D.

XV

Site : BURZAHOM

Lat : 34° 10' N

District : Srinagar

Long : 74° 54' E

State : Jammu & Kashmir

Excavated by the Archaeological Survey of India over several years.

The cultural debris at this site falls into four periods/phases of which the first two are neolithic, the third megalithic and the last early historical.

People of Period I lived in pits cut into the loessic deposits. Pits were roughly oval, circular, square or rectangular, with narrow mouths and wider bottoms. Largest pit measured in diameter 2.73 m. at the top and 4.57 m. at the bottom. Depth was 3.96 m. To facilitate entry landing steps were cut to a certain depth beyond which ladder was perhaps used. The walls of these pits were plastered with mud. The presence of post-holes at the top of the pits indicate some sort of superstructure. Some of the pits were also used for storage purposes. A few pits were also interconnected. From the evidence of hearths on the ground level near the top of the pit it is suggested that these people were leading an open air life during summer. Drains were also noticed.

Animal bones, stone and bone tools etc., were recovered from the pits.

Pottery of this period consisted of crude handmade grey ware, dull red, drab brown and buff wares. Besides a coarse burnished black ware was also seen. Impressions of mat on the bottom of certain pots were also noticed. Shapes were deep bowls with pedestal base, jars, vases and stems.

Bone tools consisted of short daggers, large and small points, awls, antimony rods, scrapers, polishers, chisels, needles with eyes, harpoons, harvesters, gravers with curved and oblique working edge, arrow-heads, etc. These were sharp and finely polished.

Polished stone tools were celts, flat and rectangular in cross-section, with a longitudinally bent body and straight cutting edge. Besides, mace-heads with hour-glass section were also available.

In the succeeding period some of the dwelling pits went into disuse. Mouths of these filled up, were plastered and covered with a thick layer of red ochre as used

for flooring. Several successive floor levels were also observed. The period is further distinguished by mud platforms with partitions and storage pits. In the upper levels vestiges of a rectangular structure of upright stones were noticed.

Ceramics of this period consisted besides those of earlier period a burnished black ware of medium fabric. Interesting shapes were funnel-shaped vessels, basins, jars with splayed out rim. Noteworthy is the high necked jar with flaring rim, globular body and flat bottom, lower part of the neck decorated with notches.

This period also witnessed the increase in frequency of stone tools and bone tools. Stone tools polished axes, harvesters, pounders, chisels, mace-heads, shoelast type double edged picks, perforated picks and double-edged points. Stone tools were fashioned out of the Himalayan trap. Bone tools were similar to these obtaining in Period I. An interesting discovery was that of a stone slab with an engraved hunting-scene.

Copper objects include arrow-heads and coils.

No burial of Period I was available. In Periods II and III burials were both primary and secondary as well. Besides human burials animal interments were also noticed. The burial-pits were circular/oval with narrow top. The inner face was plastered with mud. Four interments were in a crouching posture. Attendant burial furnishings pots, ornaments, etc. were a normal feature. In one case trepanning was also noticed. In Period II use of red ochre on human remains was a special feature. The animal burials were in similar pits. Animals were interred in an articulated posture. Animals so buried were dogs, ibex and wolf.

Period III : (Megalithic) Saw the inculcation of new ideas. Deep and wide pits were dug into earlier floor levels for megalithic structures. A rubble wall was found built over a dwelling pit. Post-holes were suggestive of building activities. The major ceramic industry was represented by a red ware. Yet some of the earlier pottery continued but in a coarse fabric and low polish suggestive of degeneration. The red ware was turned on wheel. Miniature vase was the characteristic shape. No black-and-red ware was available.

Period IV is the final cultural period belonging to the early historical period. This is earlier than the Buddhist site at Harwan. This level can be assigned to c 3rd-4th century. A.D.

- (1) TF-128 Neolithic, Phase I
Charcoal
Trench BZH-1/62 northern extension,

4205 $\pm$ 115 (4325 $\pm$ 120) B.P.
2375 $\pm$ 120 B.C.

XXII-x-XXIII. x1, layer 13,
Current Science, 34, 2, 1965, pp. 42-43
 depth 3.9 m.
 and *Radiocarbon*, 7, 1965, pp. 291-95.

- (2) TF-123 Neolithic, Phase I. Charcoal. 4055 $\pm$ 110 (4175 $\pm$ 115) B.P.
 Trench BZH-3/63, B2 (NE), 2225 $\pm$ 115 B.C.
 pit C, depth 2.8-3.5
Current Science, 34, 2, 1965, pp. 42-43 and
Radiocarbon, 7, 1965, pp. 291-95.
- (3) TF-127 Neolithic, Phase I. Charcoal 3935 $\pm$ 110 (4050 $\pm$ 115) B.P.
 Trench BZH-1/62 Northern extension, 2100 $\pm$ 115 B.C.
 XIX-x-XXII. x1, layer 13, depth 2.9 m.
Current Science, 34, 2, 1965, pp. 42-43, and
Radiocarbon, 7, 1965, pp. 291-95
- (4) TF-14 Neolithic Phase I. Charcoal with mud 3860 $\pm$ 340 (3975 $\pm$ 350) B.P.
 Trench SE, A1, depth 2.1-3 m. 2025 $\pm$ 350 B.C.
Current Science, 34, 2, 1965, pp. 42-43
 and *Radiocarbon*, 7, 1965, pp. 291-95.
- (5) TF-13 Neolithic Phase I 3690 $\pm$ 125 (3800 $\pm$ 125) B.P.
 Charcoal with a little silty soil 1850 $\pm$ 125 B.C.
 Trench BZH-3, A2 NW, pit 12, depth 1.93 m.
The Proceedings of the Indian Academy of Sciences,
 LVIII, 3, Section A, 1963, pp. 141-52 and
Radiocarbon, 5, 1963, pp. 273-82
- (6) TF-129 Neolithic Phase I. Charcoal 3670 $\pm$ 90 (3775 $\pm$ 100) B.P.
 Trench BZH-1, XIX-XXII, layer 13, 1825 $\pm$ 100 B.C.
 depth 2.9 m. Field no. BZH-1/62
Current Science, 35, 1, 1966, pp. 4-5
 and *Radiocarbon*, 8, 1966, pp. 442-52.
- (7) TF-15 Neolithic Phase I 3390 $\pm$ 105 (3485 $\pm$ 110) B.P.
 Burnt birch and hay with earth 1535 $\pm$ 110 B.C.
 Trench BZH-3, C 2 SW, pit A, depth 1.85 m.
The proceedings of the Indian Academy of
Sciences LVIII, 3, section A, 1963,
 pp. 141-52 and *Radiocarbon*, 5, 1963,
 pp. 273-82.

- (8) TF-10 Neolithic Phase II 2580 $\pm$ 100 (2655 $\pm$ 105) B.P.
 Charcoal with powdery earth. Trench BZH-1, 1705 $\pm$ 105 B.C.
 III x' -VII x' layers 6, depth 1.55 m.
The proceedings of the Indian Academy of Sciences,
 LVIII, 3, Section A, 1963, pp. 141-52 and
Radiocarbon 5, 1963, pp. 273-82.

XVI

Site : CHANDOLI

Lat : 19° N

District : Poona

Long : 74° E

State : Maharashtra

Excavated by the Deccan College and Post Graduate Research Institute, Poona.

Essentially an uni-cultural site excepting for the disturbance on top by medieval burials.

First settlement began on the black cotton soil.

Habitation has been distinguished into two : (i) loose dark brown soil with abundance of red burnt cloddy lumps and ash streaks and (ii) loose brown hard soil without any clods or ash.

Pottery consisted of the Jorwe, Malwa, lustrous red, orange slipped, ochre washed coarse red, burnished black, coarse black, black-and-red, burnished grey, sometimes with paintings in ochre or red pigment and coarse grey wares besides the cream slipped ware.

Shapes in pottery consisted of storage jars, basins, globular pots, dough plates, rimless bowls, goblets, spouted globular pots, spouted bowls, dishes-on-stands, channel spouted bowls, legged bowls, burial urns, etc.

Designs were mostly geometrical besides, antelopes, trees and mountains. In grey ware the designs comprised palm leaf, concentric circles and banner motifs.

Other antiquities consisted of beads of agate, carnelian, jasper, slate stone, steatite, shell, copper, glass and terracotta; lamps, sharpener, perforated discs, wheel, triangular cakes, stopper, toy bull, theriomorphic vessels of terracotta; saddle and flat querns, rubber stones, pounders, anvils, balls, sharpeners, etc. of stone; and chisel, celt, dagger with antanne end, fish hooks, bangles, rings, beads, rod and anklets of copper.

A few polished stone axes were also found.

Microliths consisted of cores, crested ridged flakes, irregular assymetrical flakes, parallel-sided flakes, plunging flakes, blunted baked blades, and scrapers, hollow scrapers, penknife blades, points, borers, triangles, trapezes, lunates, serrated blades and arrow-heads.

Houses were mud huts strengthened with wooden posts; walls were thinly white-washed. Floors were made by ramming gritty burnt clods of clay which formed the debris of earlier habitation.

Burials at Chandoli were similar to those found at Nevasa.

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| (1) P-473 Chalcolithic. Charcoal
Trench 7, layer 2, depth 2' .9" (0.838 m.)
Field no. 216
<i>Radiocarbon</i> , 5, 1963 pp. 82-103 | 3184 ± 68 (3280 ± 70) B.P.
1330 ± 70 B.C. |
| (2) P-472 Chalcolithic. Charcoal
Trench 8, layer 2, depth 2' 11" (0.889 m.),
Field no. 190
<i>Radiocarbon</i> , 5, 1963, pp. 82-103. | 3157 ± 68 (3252 ± 70) B.P.
1302 ± 70 B.C. |
| (3) P-474 Chalcolithic. Charcoal
Trench 9, layer 2 depth 2' 6" (0.762 m.)
Field no. 188
<i>Radiocarbon</i> 5, 1963, pp. 82-103 | 3099 ± 185 (3192 ± 190) B.P.
1242 ± 190 B.C. |
| (4) TF-42 Chalcolithic. Charcoal with earth.
Trench 2, layer 2, depth 0.5 m. below datum
Field no. 249
<i>The proceedings of Indian Academy of Sciences</i> ,
LVIII, 3 Section A, 1963, pp. 141-52 and
<i>Radiocarbon</i> , 5, 1963, pp. 273-82. | 3035 ± 115 (3120 ± 120) B.P.
1170 ± 120 B.C. |
| (5) TF-43 Chalcolithic. Charcoal with earth.
Trench 8, layer 2, depth 0.86 m. below datum,
Field no. 249 A
<i>The Proceedings of the Indian Academy of Sciences</i> ,
LVIII, 2, Section A, 1963, pp. 141-52 and
<i>Radiocarbon</i> , 5, 1963, pp. 273-82. | 2905 ± 100 (2990 ± 105) B.P.
1040 ± 105 B.C. |

XVII

Site : CHANDRAKETUGARH

Lat : 22° 41' N

District : 24—Paraganas

Long : 88° 42' E

State : West Bengal

Excavated by the University of Calcutta.

Excavations were conducted at Berachampa, Khana-Mihirer-Dhipi, Itkhola and Noongola.

Sequence of different mounds are as follows :

Berachampa : Five periods, from pre-Mauryan to Gupta period were discerned.

Period I—Pre-Mauryan : Pottery consisted of a red ware often with red slip.

Period II—Maurya and Sunga : This period is marked by the appearance of the NBP, black slipped and unpolished grey wares.

Period III—Post Sunga : The red ware appears again.

Other finds included stone beads, copper, antimony rods and cast copper coins.

Period IV—Kushan period : Pottery is typical of the period together with the typical Kushan terracottas.

*Period V—*In this period we see the introduction of burnt brick structures. Structural remains of pre-Gupta period were of mud, bamboos and tiles were used for roof.

A ramp of rammed concrete over which were the remains of mud rampart were also noticed. From the core of the rampart were recovered cast copper coins.

Khana-Mihirer-Dhipi : Seven occupational periods ranging from pre-Mauryan to post-Gupta times were noticed.

*Period I—*Pottery consisted of red and buff wares. Shapes in pottery consisted of miniature and large sized pots.

Houses were on mud plinths with bamboo or wooden posts and roofed with Mauryan tiles.

Period II – c : 6th century B.C. This period is characterised by the occurrence of the NBP, some bearing graffiti and coarse grey ware with paintings.

Beads of stones, terracotta fragment of a chariot drawn by two headless horses with decorated foreparts were the other finds.

Building materials, however, remained unaltered.

Period III—Sunga : Shapes in pottery consisted of lipped basin, dish with concentric grooves on the inner side, stamped vase and decorated casket. Some vases had painted designs, carelessly executed in black over a red surface.

Among other finds mention may be made of cast copper coins; terracotta toy cart showing a human figure mounted on an elephant, plaque of dancing female figures, animal figurines, chariots, etc.; awls and *khol* sticks of bone and ivory; beads of carnelian and other semi-precious stones; dice of bone; and steatite caskets. A fragment of a grey ware sherd bore a few early Brahmi Characters.

Building materials remained unchanged.

Period IV—Sunga—Kushan : 1st century B.C. Rouletted ware was found in this period.

Other objects included uninscribed cast copper coins; beads of glass and chalcedony; dice of bone; shell bangles and elaborately decorated terracotta figurines; handmade archaic mother goddess, chariot, etc. In the last item a plaque showing a pair of parrots pecking at a lotus pod is interesting. Unfinished beads indicated a factory site.

Period V—Gupta Period : Pottery consisted of grey and black wares, sometimes with stamped designs; a casket in NBP and Rouletted Wares.

Other finds included terracotta ear studs; terracotta plaques of animal and *mithuna* figures.

A massive polygonal structure, possibly a *sarvatobhadra* type of temple showing repairs and renovation in later times, was an important discovery.

Period VI—Late Gupta : Among other finds were awls and dice of bone, beads of carnelian and terracotta lamps.

Structural remains included a small brick temple, 5.9 m. square with a central pit showing descending off-sets to a paved floor, 40 cm. square. A small bronze image of a female deity with a mirror in her left hand and with an indistinct animal on the pedestal is an important find.

Itkhola : Six habitational periods were observed.

Period I : Pottery consisted of a ware red and buff in colour.

Period II—Early Mauryan : This period is marked by the occurrence of the N.B.P. and with stamped designs.

Other finds were ivory bangles and beads.

Common building materials were tiles and wooden posts.

A reservoir with its sides reinforced with planks and logs of wood into which a pottery drain discharged was a remarkable discovery.

Period III, IV, and V are comparable to period III of Khana-Mihirer-Dhipi.

Period VI—Sunga—Kushan period: Other finds included beads of bone and terracotta *mithuna* plaques.

At Itkhola the rampart was built of heaped up earth with later reinforcements. A moat surrounded the rampart and, perhaps, belonged to 1st century B.C. Below the rampart a massive structure built of vertical logs set on horizontal planks was discovered.

The sequence at Noongola was similar to that of Itkhola.

TF-367 Historical Shells

Trench H2, depth 2.6 m. Sample no. 2

Current Science, 38, 11, 1969, pp. 259-60;

Radiocarbon, 11, 1, 1969, pp. 188-93 and

Indian Archaeology 1967-68—A Review, pp. 69-72.

660 $\pm$ 90 (680 $\pm$ 95) B.P.

1270 $\pm$ 95 A.D.

XVIII

Site : CHIRAND

Lat : 25°.45' N

District : Saran

Long : 84°.45' E

State : Bihar

Excavated by the Department of Archaeology and Museum, Government of Bihar.

The work has been going on since 1962-63.

Excavation revealed five periods with two sub-phases in Period I and II; the culture ranging from Lower Neolithic to Pala-Pratihara times.

Period I A : Ceramic contents were a few sherds thrown on slow-wheel. But most of the vessels were handmade; the core containing grit with mica or quartz particle. Some were burnished while some others were slipped. Shapes included large jars, spouted vessels, shallow bowls, basins, etc.

Burnt daub with reed impressions indicated that the superstructures of houses were of perishable materials.

Other finds consisted of bones of birds, fish, and antler pieces.

Period I B : This phase is characterized by the appearance of a grey ware—both plain and painted. Other wares were red, black and rusticated wares besides occasional black-and-red ware. Although evidence for the potter's wheel is lacking, yet a few sherds show the use of turn-table. Some of the pots were burnished. Post-firing paintings were found on grey and black wares. Grey ware had a lustrous burnishing. Some pottery bore post-firing graffiti. One sherd showed mat impression. Painted designs were bands on rims and lips, linear designs, criss-crosses in groups, concentric semi-circles, circles etc. Punctured designs were noticed on coarse dull red and grey wares; the design elements being triangles and notch.

Shapes included pedestalled bowls, lipped bowls, sometimes perforated bowls with short ring-stand, dishes vases, high and narrow necked jars, globular vessels, spouted vessels, channel spouted vessels, footed cups, etc.

Tools found were ground pounders, grinders, rectangular celt, etc.

Microliths were more in this phase than in the earlier. Tools consisted of lunates, scrapers, parallel-sided blades, penknife blades, points, cores, tanged arrow-heads (?), etc. The materials used for the tools were chert, chalcedony, jasper and agate. Bone tools consisted of fairly well-polished points, parallel-sided bone-blade, etc.

Vestiges of houses were represented by the burnt daub clods with reed impression. Other antiquities consisted of beads of stone, steatite, chalcedony, jasper etc., and terracotta beads and toys.

The neolithic repertoire comprised bone and antler objects consisting of scrapers, chisels, hammers, points, borers, pins, styli, arrow-heads (both tanged and socketed variety) pendants, bangles of tortoise bone, reel-shaped objects, discs, and broken comb;

ground stone objects consisting of celts, pestles, querns, hammers, balls, etc. Microliths were represented by parallel-sided blades, tanged arrow-heads, points, lunates and borers.

Other objects included beads of chalcedony, agate, jasper, steatite, faience, terracotta figurines of bull, bird and *naga*, terracotta objects, *viz.*, bangles, beads, marbles, perforated discs, spindle whorls, toy-cart wheels, pendants incised and with punctured decoration, etc.

Paddy husks and grains of rice were noticed.

The period is devoid of metal and is datable to 2,000 B.C.

Period II A : Pottery consisted of white painted and plain black-and-red, steel grey and red wares.

Shapes were dishes-on-stand, some with corrugated stems, long necked jar, lipped bowl, bowl, basin, perforated vessels, sometimes having four legs, lipped jugs, dish, trough, *lota*, etc.

Painted designs in creamish white consisted of groups of dashes, wavy and straight lines.

Other antiquities were beads of terracotta, chalcedony, steatite and bone; bone arrow-heads, both tanged as well as socketed; copper wire, stone balls, etc.

Microliths included cores, flakes, etc.

Large number of animal bones and charcoal pieces were found in the several floor levels of this phase. Besides some ovens were also found.

Period III : This period is marked by the appearance N.B.P. Ware in silver grey and blue shades. However, the black-and-red ware continued.

Other finds included terracotta *naga* figure, a soap-stone bead with the head of a lion and body of a scorpion, clay anthropomorphic vessels and corroded copper punch-marked and cast coins.

Building remains were mud-walls and rammed earth floor. In the upper levels, however, burnt brick structures were encountered.

Period IV : This period is characterised by the disappearance of the N.B.P. and the black-and-red wares of the previous period. A red ware of medium to coarse fabric is noticed. The sprinkler also appears now.

Other antiquities were square and rectangular terracotta plaques having different figures and symbols; nude male terracotta figures, corroded Kushan coins, etc.

Five structural phases, the last two of which were of reused brick and brick-bats of earlier phases were noticed.

Period V : The last period is distinguished by the find in a miniature pot of five debased gold coins of the Kalachuri king Gangayadeva. Along with this two gold wire rings, four silver rings, three heavy bronze bangles plus a piece of silver were also found. Besides, a broken Pala sculpture was also discovered.

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| (1) | TF-1032 Neolithic Period I Charcoal
Trench CRD-XI, layer 13, depth 7.5 m.
<i>Indian Archaeology</i> 1970-71— <i>A Review</i>
(cyclostyled) | 3600 $\pm$ 150 (3705 $\pm$ 155) B.P.
1755 $\pm$ 155 B.C. |
| (2) | TF-1031 Neolithic Period, Charcoal
Trench CRD-XI, Layer 12, depth 7.2 m.
<i>Indian Archaeology</i> 1970-71— <i>A Review</i>
(cyclostyled) | 3525 $\pm$ 135 (3625 $\pm$ 140) B.P.
1675 $\pm$ 140 B.C. |
| (3) | TF-445 Chalcolithic, Period IIA
Wood Trench CRD-X, A2, pit sealed by
layer 11, depth 8.2 m.
<i>Current Science</i> , 38, 1, 1969, pp. 4-6,
<i>Radiocarbon</i> , 11, 1, 1969, pp. 188-93 and
<i>Indian Archaeology</i> 1967-68— <i>A Review</i> , pp. 69-73. | 3500 $\pm$ 100 (3600 $\pm$ 100) B.P.
1650 $\pm$ 100 B.C. |
| (4) | TF-1030 Neolithic, Period I Charcoal
Trench CRD-XI, layer 11, depth 6.9 m.
<i>Indian Archaeology</i> 1970-71— <i>A Review</i>
(cyclostyled) | 3430 $\pm$ 100 (3530 $\pm$ 100) B.P.
1580 $\pm$ 100 B.C. |
| (5) | TF-1034 Neolithic, Period I Charcoal
Trench CRD-XI, layer 15, depth 9 m.
<i>Indian Archaeology</i> 1970-71— <i>A Review</i>
(cyclostyled) | 3420 $\pm$ 110 (3520 $\pm$ 115) B.P.
1570 $\pm$ 115 B.C. |
| (6) | TF-1033 Neolithic, Period I Charcoal
Trench CRD-XI, layer 14, depth 8.5 m.
<i>Indian Archaeology</i> 1970-71— <i>A Review</i>
(cyclostyled) | 3390 $\pm$ 110 (3490 $\pm$ 110) B.P.
1540 $\pm$ 110 B.C. |

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| (7) | TF-1028 Chalcolithic, Period IIA. Charcoal
Trench CRD-XI, layer 10, depth 6.5 m.
<i>Indian Archaeology</i> 1970-71— <i>A Review</i>
(cyclostyled) | 3390 $\pm$ 90 (3490 $\pm$ 90) B.P.
1540 $\pm$ 90 B.C. |
| (8) | TF-1125 Neolithic, Period I Charcoal
Trench CRD-XI (Extension)
layer 14, depth 7.5 m.
<i>Indian Archaeology</i> 1970-71— <i>A Review</i>
(cyclostyled) | 3365 $\pm$ 150 (3465 $\pm$ 155) B.P.
1515 $\pm$ 155 B.C. |
| (9) | TF-1127 Neolithic, Period I Charcoal
Trench CRD-XI, layer 17, depth, 10.3 m.
<i>Indian Archaeology</i> 1970— <i>A Review</i>
(cyclostyled) | 3230 $\pm$ 95 (3325 $\pm$ 100) B.P.
1375 $\pm$ 100 B.C. |
| (10) | TF-1035 Neolithic, Period I Charcoal
Trench CRD-XI, layer 16, depth 9.2 m.
<i>Indian Archaeology</i> 1970-71— <i>A Review</i>
(cyclostyled) | 3125 $\pm$ 100 (3220 $\pm$ 105) B.P.
1270 $\pm$ 105 B.C. |
| (11) | TF-1029 Chalcolithic, Period II Charcoal
Trench CRD-XI, layer 10, depth 6.5 m.
<i>Indian Archaeology</i> 1970-71 <i>A Review</i>
(cyclostyled) | 2915 $\pm$ 85 (3000 $\pm$ 90) B.P.
1050 $\pm$ 90 B.C. |
| (12) | TF-334 Neolithic, Period IA Charcoal
Trench CRD-VII B, layer 18, depth 12.5 m.
<i>Current Science</i> , 35, 1, 1966, pp. 4-5 and
<i>Radiocarbon</i> , 8, 1966, pp. 442-52. | 2715 $\pm$ 120 (2795 $\pm$ 125) B.P.
845 $\pm$ 125 B.C. |
| (13) | TF-336 Chalcolithic, Period II Charcoal
Trench CRD-VIIB, layer 14, depth 8.5 m.
<i>Current Science</i> , 35, 1, 1966, pp. 4-5 and
<i>Radiocarbon</i> , 8, 1966, pp. 442-52. | 2640 $\pm$ 95 (2715 $\pm$ 100) B.P.
765 $\pm$ 100 B.C. |
| (14) | TF-444 Chalcolithic, Period II Charred wood
Trench CRD-VII, A2, layer 16, depth 10.5 m.
<i>Current Science</i> , 28, 1, 1969, pp. 4-6,
<i>Radiocarbon</i> , 11, 1, 1969, pp. 188-93 and
<i>Indian Archaeology</i> 1967-68— <i>A Review</i> , pp.69-72. | 2590 $\pm$ 105 (2665 $\pm$ 105) B.P.
715 $\pm$ 105 B.C. |
| (15) | TF 1036 Neolithic, Period I Charcoal
Trench CRD-XI, layer 17, depth 10.1 m.
<i>Indian Archaeology</i> 1970-71— <i>A Review</i>
(cyclostyled) | 2485 $\pm$ 120 (2555 $\pm$ 125) B.P.
605 $\pm$ 125 B.C. |

- (16) TF—1126 Neolithic, Period I Charcoal 2290 $\pm$ 120 (2355 $\pm$ 125) B.P.
Trench CRD—XI (Extension), layer 15, 415 $\pm$ 125 B.C.
Indian Archaeology 1970–71—*A Review*
(cyclostyled).
- (17) TF—446 Early historical, top levels, Period III. 1930 $\pm$ 105 (1985 $\pm$ 105) B.P.
Charred rice. Trench CRD—IC, B'–C' 35 $\pm$ 105 B.C.
layer 6, depth 3.25 m.
Current Science, 38, 11, 1969, pp. 259–60.
Radiocarbon, 11, 1, 1969, pp. 188–93 and
Indian Archaeology 1967–68—*A Review*, pp. 69, 72.

Dates of some of the samples coming from the same locus viz., TF 1034, 1127, 1036, 1125, 1126, etc. are stratigraphically incompatible.

XIX

Site : DHARANIKOTA

Lat : 16° 34' 45"N

District : Guntur

Long : 80° 24' 21" E

State : Andhra Pradesh

Excavated by the Archaeological Survey of India.

Two cuttings, one across the western side of the fortified township and the other in the habitation area inside the fort were made.

In the former seven structural phases, of which earlier six related to the embankment-cum-wharf abutting a navigational channel and the last to the defence system. The first is related to the coming up of the channel, second to fifth indicate the building of wharf and the successive repairs, strengthening or hightening of the sides of the channel. In the sixth phase erosional activity is noticed while the seventh the channel was abandoned and got completely filled up. In the other trench in the habitation area seven occupational periods were noticed.

Period I : is characterised by the occurrence of the megalithic black-and-red ware and hearth with vent holes.

Period II : In this period the megalithic black-and-red ware continued. Other finds were goldsmith's mould, glass bangles, ear rings, etc.

Structural remains were drains or cut channels and post holes.

Period III : is distinguished by the appearance of the Rouletted Ware. Soakage pits also occur in this period.

Period IV : The pottery of this period constitute the megalithic black-and-red, all black, red, grey and the rouletted wares. Grey ware was the dominant ceramic.

Structural remains include, besides others a circular brick structure.

Period V : though not well-defined was the continuation of the previous period.

Period VI : is distinguished by the presence of late Satavahana coins, inscribed ivory seal showing *stupa* with railings. On palaeographical grounds the seal is datable to c. 2nd-3rd century A.D.

Period VII : marks the abandonment of the site. The last structural activity in this period before desertion was the occurrence of a tiled platform.

Initial date of the site would be c. 200 B.C.

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| (1) | TF-246 Early historical, Period I (?) Charcoal
Trench DKT-1, XXXVI-XLII,
layer 11, depth 6.5 m.
<i>Current Science</i> , 35, 1, 1966, pp. 4-5 and
<i>Radiocarbon</i> , 8, 1966, pp. 442-52 | 2355 ± 95 (2425 ± 100) B.P.
475 ± 100 B.C. |
| (2) | TF-247 Early historical, Period I Charcoal
Trench DKT-2, A2-A3, layer 8,
depth 3.7 m. Field no. DKT-2, 63, no. 1
<i>Current Science</i> , 35, 11, 1966, pp. 276-278 and
<i>Radiocarbon</i> , 8, 1966, pp. 442-52. | 2275 ± 100 (2340 ± 100) B.P.
390 ± 100 B.C. |
| (3) | TD-248 Historical, Period II (?) Charcoal
Trench DKT-1, XXXVI-XXXIX,
layer 10, depth 6. m. Field no. DKT-1/63/no III
<i>Current Science</i> , 35, 11, 1966, pp. 276-78 and
<i>Radiocarbon</i> , 8, 1966, pp. 442-52. | 2095 ± 100 (2155 ± 100) B.P.
205 ± 100 B.C. |

XX

Site : DWARAKA

Lat : 22° 15' N

District : Jamnagar

Long : 69° 00' E

State : Gujarat

Excavated by the Department of Archaeology, Government of Gujarat jointly with the Deccan College and Post Graduate Research Institute, Pune.

The dig revealed three periods, characteristics of which are as follows :

Period I : Ceramics of this period consisted of a fine ware of which some were painted. Iron was also associated with this period.

A thick deposit of sand separated this period from the succeeding.

Period II : is marked by the appearance of the Red Polished Ware and Roman amphorae.

Period III : After a lapse of several centuries, evidenced by a deposit of sand the earliest phase of temple city (c. 7th cent. A.D.) begins. Fragments of wall mouldings, finials, etc., were recovered.

The excavation throws light on the submergence of the city in about the 2nd century. B.C.

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TF-173 Medieval Period III. Charcoal
Trench A, 3.40 x 1.50 m.,
layer 3, depth 1.45 – 1.50 m.
Current Science, 33, 9, 1964, pp. 266–69 and
Radiocarbon, 6, 1964, pp. 226–32.

310 $\pm$ 90 (320 $\pm$ 95) B.P.
1630 $\pm$ 95 A.D.

XXI

Site : ERAN

Lat : 24° 05' N

District : Sagar

Long : 78° 10' E

State : Madhya Pradesh

Excavated by the University of Sagar.

The site is identified with the ancient Arikinia.

Four cultural periods were distinguished.

Period I: neolithic-chalcolithic (second half of the second millennium B.C.) : Pottery of this period consisted of black-and-red, some with white paintings, thick grey and black on red (mostly of the ' Malwa ' fabric), thin plain grey Wares. Some of the thick grey wares bore paintings in light red; the design being linear patterns.

The design repertoire in black painted red ware was mostly geometrical, besides dogs, stylised antelopes, goat-like animal, etc. A few bore incised decoration as well.

Shapes in pottery were jars and bowls in thick grey ware, channel-spouted vessels in white painted black-and-red and jars in red ware.

Other antiquities included animal figurines, beads and bangles in terracotta; shell bangles; steatite and semi-precious stone beads; bone pins; stone balls, circular gold piece, circular copper objects, fragmentary copper celt, etc. Microliths comprised core, short parallel-sided blades, lunates, trapezes, points, pen-knife blades, etc. Neolithic association in this period is established by the find of four celts.

On the basis of pottery and finds this period is divided into three, early, middle and late phases; the latter two distinguished by the appearance of white painted black-and-red ware and the channel spouted vessels respectively.

The mud rampart 6.40 m. high with a basal width of 47 m. constructed of black and yellow clay was built in the middle phase of this period and remained in use in period II as well. It was surrounded by a moat. Two structural phases were observed in the rampart.

Period II (a few centuries before the Christian era) : The period is divided into two—IIA and IIB; the former characterised by iron and black-and-red ware different in shape and fabric from the preceding period and N.B.P. and early punch-marked coins; the latter by the red ware with stamped design and structures particularly ring wells and floors of rammed brickbats.

Minor antiquities were beads of terracotta shell, paste and semi-precious stones; weights of jasper, shell bangles; iron objects; stone objects; bone pins; punch-marked coins, circular lead piece with legend in Mauryan Brahmi reading *Rano Idagutasa*.

Period III (first five centuries of the Christian era) : This period is characterised by the complete absence of the black-and-red ware and the appearance of the Red Polished Ware. The black painted red ware, however, continued.

Other finds of this period were beads of terracotta, glass, shells and semi-precious stones; shell bangles; human figurines with elaborate headdresses, cow, bone dice, frog in shell; fragment of copper sword, stone image of Mahishamardini, etc.

Among coins mention may be made of those of Rama Gupta, both lion and garuda types, silver and copper punch marked coins, those of the Western Kshatrapa rulers viz., Vijayasena, Rudrasena, Visvasimha and Rudrasimha.

Terracotta seals and sealings were also found. Important among them being the one depicting Gajalakshmi in the upper half below which is a two line inscription in Gupta characters reading *Airikine Gomika vishaya adhikara (nasya)* and one of a hitherto unknown Western Kshatrapa ruler, the legend reading *ragno Isvaramitra puttasya rango Simhasenasya*.

An important find is a hoard of 1268 punch-marked coins datable to 200 B.C.

Structural activities can be gleaned through the vestiges of rings wells, stone walls, etc.

Period IV (Late medieval period 16-18th century A.D.): The period is characterised by the prolific find of glass and lac bangles and massive fortification in the late phase. In the latest levels copper coins of the Indian States of Bhopal and Gwalior were also found.

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| (1) P-529 Neolithic-chalcolithic Period I (?)
Charcoal and clay, layer 4,
depth 12'2"-12'4" (3.7-3.75 m.)
<i>Radiocarbon</i> , 5, 1963, pp. 82-103. | 3868 ± 72 (3994 ± 74) B.P.
2044 ± 74 B.C. |
| (2) TF-331 Neolithic-chalcolithic, Period I
Charcoal Trench ERN 7, IV'-IX', layer 21,
depth 8 m. Field no. ERN 7/C/62-63-8
<i>Current Science</i> , 38, 1, 1969, pp. 4-6 and
<i>Radiocarbon</i> 10, 1968, pp. 131-43. | 3355 ± 90 (3450 ± 95) B.P.
500 ± 95 B.C. |
| (3) TF-329 Neolithic-chalcolithic, Period I
Charcoal Trench ERN 7, VI-IX', layer 19,
Depth 7.5 m. Field no. ERN 7/C/62-63-6
<i>Current Science</i> , 38, 1, 1969, pp. 4-6 and
<i>Radiocarbon</i> , 10, 1968, pp. 131-43. | 3300 ± 105 (3395 ± 110) B.P.
1445 ± 110 B.C. |

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| (4) | TF-327 Neolithic-chalcolithic, Period I
Charcoal Trench ERN 7, VI-IX', layer 17,
depth 6.8 m. Field no. ERN-7/C/62-63-4
<i>Current Science</i> , 38, 1, 1969, pp. 4-6 and
<i>Radiocarbon</i> , 10, 1968, pp. 131-43. | 3280 $\pm$ 100 (3375 $\pm$ 105) B.P.
1425 $\pm$ 105 B.C. |
| (5) | TF-330 Neolithic-chalcolithic, Period I
Charcoal Trench ERN 7, IV'-IX', layer 20,
depth 7.7 m. Field no. ERN 7/C/62-63-7
<i>Current Science</i> , 38, 1, 1969, pp. 4-6 and
<i>Radiocarbon</i> , 10, 1968, pp. 131-43. | 3220 $\pm$ 100 (3315 $\pm$ 100) B.P.
1365 $\pm$ 100 B.C. |
| (6) | P-525 Early historical, Period II (?)
Charcoal and clay, layer 15,
depth 17'.2" (5.25 m.)
<i>Radiocarbon</i> , 5, 1963, pp. 82-103 | 3193 $\pm$ 69 (3288 $\pm$ 71) B.P.
1338 $\pm$ 71 B.C. |
| (7) | P-526 Early historical, Period II (?)
Charcoal and clay, layer 18 c,
depth 19'9"-20'7" (6.0-6.27m.)
<i>Radiocarbon</i> , 5, 1963, pp. 82-103 | 3136 $\pm$ 68 (3230 $\pm$ 70) B.P.
1280 $\pm$ 70 B.C. |
| (8) | TF-324 Early Historical, Period IIa Charcoal
Trench ERN 7, 0' -N', layer 14,
depth 5.3 m. Field ERN-7/C/62-63-1
<i>Radiocarbon</i> , 10, 1968, pp. 131-43. | 3130 $\pm$ 105 (3224 $\pm$ 108) B.P.
1274 $\pm$ 108 B.C. |
| (9) | Period IIa Charcoal
Trench ERN 7, IV'-IX', layer 16,
depth 6.3 m. Field no. ERN 7/C/62-63-3
<i>Radiocarbon</i> , 10, 1968, pp. 131-143. | 2905 $\pm$ 105 (2992 $\pm$ 108) B.P.
1042 $\pm$ 108 B.C. |
| (10) | P-528 Charcoal and clay
Layer 20, depth 24' - 24'8" (7.3 - 7.51 m.)
<i>Radiocarbon</i> , 5, 1963, pp. 82-103. | 2878 $\pm$ 65 (2964 $\pm$ 66) B.P.
1014 $\pm$ 66 BC |
| (11) | P-527 Charcoal and clay
Layer 19, depth 22'3" - 22'7" (6.78 - 6.93 m.)
<i>Radiocarbon</i> , 5, 1963, pp. 82-103. | 2515 $\pm$ 58 (2590 $\pm$ 60) B.P.
640 $\pm$ 60 B.C. |

XXII

Site : HALINGALI

Lat : 16° 0' 30" N

Disrtict : Bijapur

Long : 75° 6' 40" E

State : Mysore

A megalithic burial site excavated by Shri A. Sundara of the Deccan College and Post Graduate Research Institute, Pune.

Four burial monuments were opened, falling into two types, cist and stone-circles. The cists were of two sub-types; (i) with three rectangular courts on the cardinal points and passage on the south, the whole resembling a Greek Cross and (ii) circular cists with passage on the south covered by a cairn, the whole enclosed by a double circle or a circle and a rectangle.

Megaliths I & II were stone circles yielding a few sherds of the megalithic pottery. Megalith III a cist of sub-type (i) had pillars along the principal axis. The orthostats and the enclosing rectangles were structural walls. Pottery, iron objects and fragments of human bones were the contents. Megalith IV, a circular cairn with three short pillars at the periphery on the west, south and east. From the burial-pit fragments of neolithic-chalcolithic grey ware and from the south-eastern quadrant megalithic red ware sherds were recovered.

TF-685 Megalithic (Burial)
Charcoal Locus HGL, Meg. III,
depth 1.31-1.41 m.
Field no. HGL/Meg, III-24
Radiocarbon, 11, 1969, pp. 188-93 and
Indian Archaeology 1967-68 - *A Review*, pp. 69-72.

1970 $\pm$ 95 (2030 $\pm$ 100) B.P.
80 $\pm$ 100 B.C.

XXIII

Site : HALLUR

Lat : 14° 20' N

District : Dharwar

Long : 75° 37' E

State : Mysore

Site was excavated jointly by the Kannada Research Institute, Karnatak University, Dharwar and the Deccan College Post Graduate Research Institute, Pune.

The site is situated on the left bank of the River Tungabhadra; the occupation deposits being 6.40 m. thick.

Three periods, lower neolithic, free from metal and microliths consisting of a blade industry; upper neolithic showing intrusion of chalcolithic element; and an overlap of the neolithic and the megalithic cultures were distinguished.

RD-7

Period I : Lower neolithic : The ceramic contents were a coarse brown-and-black, a pale grey and burnished black wares, last sometimes painted with red ochre. Ground and pecked stone implements were found.

Period II : The main ceramic industry was the coarse brown-and-black ware. The pale grey was found in diminishing quantity. A few sherds of painted red ware, the pigment used being black were also found.

This period is distinguished by the sudden occurrence of large number of blades in black chert, copper implements viz., fish hooks, and miniature double edged axes fashioned out of flat copper sheets, steatite and shell beads, etc.

Floors were of rammed bed of schist chips. Houses, as evidenced from the disposition of the post-holes, were round. A few circular hearths were also found. A few neck-rests comparable with T' Narsipur specimens are interesting. Small quantities of charred grains were also found.

A double pot burial with remains of a child was noticed underneath the floor of a house.

Period III : is characterised by the sudden emergence of black-and-red ware including the white painted variety. Ceramics of the earlier period, however, continued. Other finds included arrow-heads, spear-heads, etc. of iron.

A short distance from this site were noticed several dolmenoid cists.

TF-580 Lower neolithic Period I	3560 $\pm$ 105 (3660 $\pm$ 105) B.P.
Charcoal	1710 $\pm$ 105 B.C.

Trench-1, layer 14, depth 6.1 — 6.4 m.,
Field no. HLR/1965, Sample no. 11.
Current Science, 35, 23, 1966, pp. 585-86 and
Radiocarbon, 10, 1968, pp. 131-43.

TF-576 Lower Neolithic Period I Charcoal	3280 $\pm$ 105 (3375 $\pm$ 110) B.P.
Trench 1, layer 8, depth 3.6 m.	1425 $\pm$ 110 B.C.

Field No. HLR/1965
Radiocarbon, 11, 2, 1969, pp. 502-508 and
Indian Archaeology 1967-68 — *A Review*, pp. 69-72.

TF-586 Lower Neolithic Period I Charcoal	3055 $\pm$ 95 (3145 $\pm$ 100) B.P.
Trench 2, pit sealed by layer 8, depth 2.8 m.	1195 $\pm$ 100 B.C.

Radiocarbon, 11, 1, 1969, pp. 188-93 and
Indian Archaeology 1967-68 — *A Review*, pp. 69-72.

TF-575 Upper neolithic Period II 2895 $\pm$ 100 (2980 $\pm$ 105) B.P.
 Charcoal Trench 1, layer 7, depth 3.2 m. 1030 $\pm$ 105 B.C.
 Field no. HLR/1965, sample no. 6
Current Science, 35, 23, 1966, pp. 585-86 and
Radiocarbon, 10, 1968, pp. 131-43.

TF-570 Neolithic megalithic 2970 $\pm$ 105 (3055 $\pm$ 105) B.P.
 Period II-II overlap phase 1105 $\pm$ 105 B.C.
 Charcoal Trench 1, layer 4, depth 1.8-2.1 m.
 Field no. HLR/1965, sample no. 1
Current Science, 35, 23, 1966, pp. 585-86 and
Radiocarbon, 10, 1968, pp. 131-43.

TF-573 Neolithic-Megalithic 2820 $\pm$ 100 (2905 $\pm$ 100) B.P.
 Period II-II overlap phase 955 $\pm$ 100 B.C.
 Charcoal Trench 1, layer 5, depth 2.35-2.55 m.
 Field no. HLR, 1965, sample no. 4.
Current Science, 35, 23, 1966, pp. 585-86 and
Radiocarbon, 10, 1968, pp. 131-43.

Dates of TF-570 and TF-573 show stratigraphic incompatibility

XXIV

Site : HARRAIPUR

District : Birbhum

State : West Bengal

Excavated by the Archaeological Survey of India.

The trench was laid at Solkhana on the western side of tank in the village revealing a 3.5 m. deep habitational deposit consisting of six layers. Constituents of the layers were as follows :

Layers 6 and 4	plain and painted black-and-red ware
Layers 5 and 3	a local grey ware, red slipped, mostly on the outside but occasionally on both sides, and
Layer 2	Remains of a brick structure resting on charred horizontal wooden logs.

In addition ten extended burials of children, oriented north-south and without grave furnishings were also discovered.

TF-611 Elephant's tusk
 From river terrace Field no. HRP-F.1
Current Science, 36, 21, 1967, top 566-68 and
Radiocarbon, 10, 1968, pp. 131-43.

4070 ± 95 (4190 ± 95) B.P.
 2240 ± 95 B.C.

Apparently the date cannot be considered true for the excavated area.

XXV

Site : HASTINAPUR

Lat : $29^{\circ} 09' N$

District : Meerut

Long : $78^{\circ} 03' E$

State : Uttar Pradesh

Excavations were conducted by the Archaeological Survey of India.

The mound here consisting of two blocks is about 60 feet (18.28 m.) high.

The habitation is divisible into five cultural periods; each period is intervened by a period of desertion.

Period I (pre 1200 B.C.): Habitation began just above the natural soil and was sporadic. Ceramics consisted of rolled fragments of Ochre coloured pottery made of medium grained clay coloured orange red to deep red. But for rims no shapes were observed.

Period II : Ceramics of the period consisted of the P.G.W. black slipped, a few black-and-red, red slipped and red Wares.

Shapes in the main ceramic viz., P.G.W. comprised bowls and dishes. Both wheel-turned and hand-made specimens were available.

Pigment used for painting was black but occasionally chocolate or reddish brown was also noticed. The design repertoire comprised simple band, groups of verticals, oblique or criss-cross lines normally on the outside; rows of dots or dashes or dots alternating with simple lines connected short spirals, concentric circles/semi-circles, sigmas, *svastikas* etc. On medium grained grey ware and reddish brown slipped ware the paintings were in deep chocolate colour.

Regular house plans were not available. Walls were of mud, mud-bricks and reed plastered over with mud. A fragment of a burnt brick was also found.

Other antiquities of the period consisted of arrow-heads, nail parer, antimony rods of copper, cylindrical objects (weights) of chert and jasper; beads of semi precious stones; reel shaped objects, fragment of a bangle, styli or knitting needles of bone, animal figurines; discs, feeding cup with a nozzle on one side and loop handle on the other; pendent, stamp with a circle in the centre and notches along the periphery of terracotta; and whetstone of slate.

Animals known, as deduced from the bone remains, are horse, pig, cattle, etc.; some of them show clear cut marks.

Iron slags in the upper layers indicate the knowledge of the metal.

Period III (early 6th cent. to early 3rd cent. B.C.) : Pottery consisted of the N.B.P., coarse grey and unslipped red wares. Shapes consisted of bowls, *handis* and carinated bowls; dishes basins with impressed designs, pear-shaped vases, carinated *handis*, with lug handles, etc. in the various wares.

Houses were of mud-bricks and kiln burnt bricks. Other structural remains were brick-lined drains, soakage jars with perforations and placed one above the other and terracotta ring-wells.

Other finds included barbed and socketed arrow-heads, chisel, sickle etc. of iron antimony rods, nail parer, bangle, rings, latch, ferrule and reel of copper; animal and human figurines, flesh-rubber etc. of terracotta; beads of etched carnelian, crystalline quartz, glass and terracotta; rings of chalcedony and jadeite. Besides silver punch-marked and cast copper coins were found.

Period IV (Sunga-Kushan-early 2nd cent. B.C. to late 3rd cent. A.D.) : The ceramics of the period was an exclusively red ware of medium fabric and were wheel-turned. In the upper levels, however, black-and-red pottery was found.

Shapes consisted of bowls, spouted basins, button knobbed and ink-pot lids, bottle-necked sprinklers, etc. Stamped and incised decorations comprised *svastika*, *triratna*, fish, leaves, flowers, loops, lozenges, circles and other geometric combinations.

Other antiquities of the period were antimony rods, pins, bell stoppers etc. of copper; nails; axe-adze, sickle, pan with handle bell etc. of iron; finely moulded and hand modelled Sunga terracottas from lower levels, a Bodhisattva Maitreya of the Mathura School from upper levels, animal figurines, wheels, toy-carts and votive tanks of terracotta; rotary quern of stone; lids of steatite, sandstone and chalcedony incised with floral designs and rings, beads of carnelian, jasper and terracotta.

Inscribed potsherds in Brahmi and reading *Sadhujatasa* and *nikasa* were found. A seal with a three line legend reading *Thi (?) kaputrasa Jayasamasa roddisa(?)*

was also found. Coins of the rulers of Mathura datable to 2nd Century B.C. and Yaudheyas assigned to the beginning of the Christian era and imitation coins of the Kushan king Vasudeva were also discovered.

Houses with regular plans were usually of burnt bricks and floorings were of square brick. Orientation was along the cardinal directions. Seven structural sub-periods could be noticed.

Period V – late 11th to early 15th century A.D.:— Pottery of this period was very much different from that of the earlier periods and consisted of a red ware, coarse to medium in fabric and glazed ware with floral designs. Some of the pots were painted in black pigment. Shapes in pottery comprised knife-edged bowls, flat plates, pedestalled cups, lids with hollow conical knob. Stamped designs and incised and applied patterns were wavy lines, loops, scrolls, chequers, leaves, etc.

Other antiquities were nails, tanged arrow-head, spear-head, hoes, door-rings, knife-blades, awls, etc., of iron; *satisatta* plaques, stamps and dabbers of terracotta; bangles of glass, ivory, shell, bone and stratified glass.

A coin of Balban was also found.

Four structural phases were observed.

They were of brick-bats from earlier periods.

- (1) ■ TF-91 Painted Grey Ware—Late levels, Period II 2450 ± 120 (2520 ± 125) B.P.
Charcoal with earth 570 ± 125 B.C.
Trench HST-1/1962, XCIV–XCVII,
layer 27, depth 6.9 m.
Field no. HST/62/C/18
Current Science, 33, 9, 1964, pp. 266–69 and
Radiocarbon, 6, 1964, pp. 226–32.
- (2) TF-85 Painted Grey Ware, 2385 ± 125 (2455 ± 130) B.P.
Late levels, Period II 505 ± 130 B.C.
Charcoal with earth
Trench HST-1/1962,
XC–XCIV, layer 28
and pit Z sealed by layer 27,
depth 7.25 to 7.45 m.
Field no. HST/62/C/10
Current Science, 33, 2, 1964,
pp. 40–42 and
Radiocarbon, 6, 1964, pp. 226–32.

- (3) TF-90 Painted Grey Ware
end levels. Periods II
Charcoal with earth
Trench HST-1/1962, XCIV-XCVII,
Layer 26, depth 6.6 m.
Field no. HST/62/C/17.
Current Science, 33, 2, 1964, pp. 40-42 and
Radiocarbon, 6, 1960, pp. 226-32. 2270 $\pm$ 110 (2335 $\pm$ 110) B.P.
385 $\pm$ 110 B.C.
- (4) TF-112 Painted Grey Ware,
end level. Period II
Bones
Trench HST-1/1962, XC'-XCVII'
layer 26 and pit Y sealed by
layer 25, depth 6.8 m.
Field no. HST/62/C/7
Current Science, 33, 9, 1964,
pp. 266-69 and
Radiocarbon, 6, 1964,
pp. 226-32. 2260 $\pm$ 95 (2325 $\pm$ 100) B.P.
375 $\pm$ 100 B.C.
- (5) TF-88 N.B.P. Ware-Beginnings-
Period III
Charcoal with earth
Trench HST-1/1962, XCIV-XCVII,
layer 25, depth 6.45 m.
Field no. HST/62/C/15
Current Science, 33, 2, 1964,
pp. 40-42. and
Radiocarbon, 6, 1964,
pp. 226-32. 225 $\pm$ 110 (2290 $\pm$ 110) B.P.
340 $\pm$ 110 B.C.
- (6) TF-83 Painted Grey Ware, end level
Period II
Charcoal with earth
Trench HST-1/1962, XCIV-XCVII,
layer 26 and pit Y sealed by layer 25,
depth 6.75 m.
Field no. HST/62/C/6
Current Science, 33, 2, 1964,
pp. 40-42 and
Radiocarbon, 6, 1964, pp. 226-32. 2220 $\pm$ 110 (2285 $\pm$ 110) B.P.
335 $\pm$ 110 B.C.

- (7) TF-81 N.B.P. Ware – end level. 2015 $\pm$ 95 (2075 $\pm$ 100) B.C.
125 $\pm$ 100 B.C.
 Period III
 Charcoal with earth
 Trench HST-1/1962, XC-XCIV,
 layer 18, depth 5.1 m.
 Field no. HST/62/C/2
Current Science, 33, 9, 1964, pp. 226-69
 and
Radiocarbon, 6, 1964, pp. 226-32.
- (8) TF-80 and TF 82 N.B.P. Ware, end level. 1940 $\pm$ 110 (2000 $\pm$ 110) B.P.
50 $\pm$ 110 B.C.
 Period III
 Charcoal with earth
 Trench HST-1/1962
 (northern extension)
 G-H, layer 23
 Field no. HST/62/C/1
Current Science, 33, 2, 1964, pp. 40-42 and
Radiocarbon, 6, 1964, pp. 226-32
- (9) UCLA-684 1800 $\pm$ 100 (1854 $\pm$ 103) B.P.
46 $\pm$ 103 A.D.
 Human Bones
Radiocarbon, 7, 1967, pp. 336-71
 This level is said to be comparable to that of TF-90. But the date is much younger
 and deserves to be rejected.

XXVI

Site : HATHINIA HILL

District : Varanasi

State : Uttar Pradesh

Excavated by the University, Allahabad.

Two cuttings were made in the habitational area where the cultural deposit was about 1.40 cm. Three sub-phases were noticed.

Sub Phase IA : This phase yielded an ill-fired pottery and microliths. Structures were of mud.

Sub Phase IB: This was characterised by the occurrence of microliths in prolific numbers, beads and sling-stones. Tool-types were crested guided ridge blades, etc.

Sub Phase IC: This phase exhibited a decline in habitation. Pottery consisted of red, black-and-red, black wares. Some types in black-and-red were similar to those found at Sonpur, Chirand, etc. Microliths were of low workmanship, small and broken.

TF-109 Megalithic (?)
Charcoal on the earth
Trench KKR-A1, III-IV,
pit-A sealed by layer 1,
depth 1.09 m. Field no.
HAH/63/KKR-2

30 ± 90 (30 ± 95) B.P.
 1920 ± 95 A.D.

Current Science, 33, 9, 1964, pp. 266-69

and

Radiocarbon, 6, 1964, pp. 226-32

Date is younger than archaeological estimation.

XXVII

Site: INAMGOAN

Lat: 18°35' N

District: Pune

Long: 74°32' E

State: Maharashtra

Site was excavated by the Deccan College and Post-graduate and Research Institute, Pune.

The site spreading over an area of 500 sq. m. was selected for horizontal excavation.

Digging revealed two cultural periods-Period I the Malwa (Central Indian Chalcolithic) and Period II the Jorwe Culture-with sub-phases in the latter.

Period I Malwa culture: This period yielded pottery and blades only. Apart from the Malwa Ware, coarse grey, red and black burnished (less frequent) wares were found. Besides the characteristic shapes in the Malwa Ware a vessel with tubular spout was noticed. The stumpy goblet or chalice was absent. In the black burnished ware, handled bowl is noteworthy.

Structural activity of this period was evidenced by a house, rectangular on plan with dwarf mud-walls and reed plastered walls. Within the house two circular pits at different levels were noticed; the lower one was perhaps utilized as a storage bin while the upper one, as seen by the post-holes, was perhaps intended for living.

No burials of this period were encountered.

Period II phase 1 : The characteristic ceramic of this phase was the Jorwe Ware with its, concave-sided carinated bowls and *lotas*.

Period II phase 2 : In this phase the fabric of the pottery is coarse with a dull red surface. The carinated bowl was replaced by the convex sided bowl. However, a few bowls of the earlier phase with outcurved rim persisted. Besides, a coarse grey and a few sherds of sandy wares were noticed. A huge handmade jar with incised and applique designs was found. In the late phase black-and-red ware appeared. The coarse red ware was painted in black. The colour of the ware was sometimes orange. Painted patterns were geometrical including the *svastika*, abstract human forms, stylized deer, etc.

Shapes included convex-sided bowl, channel spouted vessels, hinge-necked jars in the red ware. The grey ware was reminiscent of the southern neolithic grey ware. It was handmade and occasionally decorated with incised and applique patterns.

Other finds consisted of blade flakes of siliceous material, ground polished stone axes, fish hooks, a small pan and small poker of copper; objects of bone and antler; unbaked clay figurines, potter's dabber; terracotta mother goddess, bull, boar, beads of semi-precious stones, ivory, shell and gold.

Structures of this phase consisted of houses, circular on plan. Roof was perhaps conical and was supported by wooden posts. The floors were of rammed yellow silt plastered over with cow dung and lime. Walls were reed screens plastered over with mud. Average diameter of houses ranged from 2 to 2.5 m. The biggest one measured 4 m. in diameter. In one house an oval *chulah* (oven) was also noticed.

Children were buried in two urns of grey ware placed mouth to mouth horizontally in a pit oriented north-south. Burial furnishing consisted of a bowl and spouted vessels. In two of the burials animal bones were also noticed. Adults were interred in extended position in pits oriented north south with a few pots. In one burial two black-and-red bowls were found.

This phase can be assigned to c. 1000–700 B.C.

In general the antiquities found in both periods included blades produced by the crested guided ridge technique, polished stone axes, sling balls, mace-heads

and querns; fish hooks, fragments of bangles, tongs, etc. of copper; points, punch of bone and antler; shell bangles, reel-like ear-ornaments of terracotta etc.

The site was probably a factory site for bead making.

Economy of the people was the farming and hunting stage.

Charred grains of wheat, lintel *jowar* and possibly rice were recovered.

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| <p>(1) TF-1001 Chalcolithic. Charcoal
Trench INM-I A1-A2 layer 16
<i>Current Science</i>, 41, 13, 1972, pp. 478-79, and
<i>Indian Archaeology 1970-71-A Review</i>,
(cyclostyled)</p> | <p>3415$\pm$90 (3515$\pm$95) B.P.
1565$\pm$95 B.C.</p> |
| <p>(2) TF-1086 Chalcolithic. Charcoal
Trench INM-I, D1, layer 8
<i>Current Science</i>, 41, 13, 1972, pp. 478-79 and
<i>Indian Archaeology 1970-71-A Review</i>,
(cyclostyled)</p> | <p>3385$\pm$150 (3485$\pm$155) B.P.
1535$\pm$155 B.C.</p> |
| <p>(3) TF-1085 Chalcolithic. Charcoal
Trench INM-I, C2, layer 6, depth 1.82 m.
<i>Current Science</i>, 41, 13, 1972, pp. 478-79.</p> | <p>3295$\pm$105 (3390$\pm$110) B.P.
1440$\pm$110 B.C.</p> |
| <p>(4) TF-1087 Chalcolithic. Charcoal
Trench INM-I, D2, layer 12,
<i>Current Science</i>, 41, 13, 1972, pp. 478-79.</p> | <p>3260$\pm$105 (3355$\pm$105) B.P.
1405$\pm$105 B.C.</p> |
| <p>(5) TF-1000 Chalcolithic. Charcoal
Trench INM-I, D2, layer 15
<i>Current Science</i>, 41, 13, 1972, pp. 478-79 and
<i>Indian Archaeology 1970-71-A Review</i>,
(cyclostyled)</p> | <p>3230$\pm$80 (3325$\pm$85) B.P.
1375$\pm$85 B.C.</p> |
| <p>(6) TF-924 Chalcolithic. Charcoal
Section scraping from floors 1 and 2 and
layer 2, Field no. 139
<i>Indian Archaeology 1969-70-A Review</i>, pp. 63-69
and <i>Current Science</i>, 41, 13, 1972, pp. 478-79.</p> | <p>3225$\pm$200 (3320$\pm$200) B.P.
1370$\pm$200 B.C.</p> |

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| (7) TF-922 Chalcolithic. Charcoal
Mound 1, Trench C 3, layer 5,
depth 1.3 m. Field no. 63
<i>Indian Archaeology</i> 1969-70-A Review, pp. 63-69
and <i>Current Science</i> , 41, 13, 1972, pp. 478-79. | 3205 ± 100 (3295 ± 100) B.P.
1345 ± 100 B.C. |
| (8) TF-996 Chalcolithic. Charcoal
Trench INM-I, A2, layer 4, pit, depth 1.5 m.
<i>Current Science</i> , 41, 13, 1972, pp. 478-79 and
<i>Indian Archaeology</i> 1970-71-A Review,
(cyclostyled) | 2930 ± 180 (3020 ± 185) B.P.
1070 ± 185 B.C. |
| (9) TF-923 Chalcolithic. Charcoal
Mound 1, Trench C2, layer 5,
depth 1.8 m. Field no. 133
<i>Indian Archaeology</i> 1969-70-A Review, pp. 63-69
and <i>Current Science</i> , 41, 13, 1972, pp. 478-79. | 2890 ± 170 (2975 ± 170) B.P.
1025 ± 170 B.C. |
| (10) TF-995 Chalcolithic (?)
Charcoal
Trench INM-I, A2, layer 3.,
<i>Indian Archaeology</i> 1970-71-A Review
(cyclostyled) | 1775 ± 125 (1825 ± 125) B.P.
125 ± 125 A.D. |
| (11) TF-997 Chalcolithic (?) Charcoal
Trench INM-I, D2, layer 7, depth 2.8 m.
<i>Indian Archaeology</i> 1970-71-A Review
(cyclostyled) | 1530 ± 105 (1575 ± 105) B.P.
375 ± 105 A.D. |

XXVIII

Site : KAKORIA

Lat : 25°03' N

District : Varanasi

Long : 83°11' E

State : Uttar Pradesh

Excavated by the University, Allahabad.

In all twelve megaliths were excavated, of which eight were cairn-circles and four cist-circles.

Constructional details of the types of monuments are as follows:

Cairn-circles : These varied in diameter from three to nine metres and rose to a height varying from one to two metres. These concealed a pit inside. The pit

was dug into the natural soil to a maximum depth of 1.52 m. Longer axis of the pit was normally north-south; variation towards east-west was also observed. The pit was oval or oblong on plan. The filling inside the pit was the same as the dug out material; the whole was finally covered by a mass of granite rubble and circumscribed by a stone-circle.

Cist-circle : For constructing a cist-circle a pit of required size was dug into the natural soil. The sides of the pit were lined with two or three courses of stone pieces piled one over the other. These formed the orthostats. The floor was also made up like-wise. The cist was filled with earth over which the capstone was hoisted. The entire area was covered by a heap of small stones in the form of a cairn and circumscribed by stone-circle.

Excavated cists were mostly disturbed.

Contents inside the cairn-circles were pots, beads, gold objects, skeletal remains and stone implements including microliths. These were placed generally on the floor excepting in one case where they were found at all levels. Only one cist-circle yielded a few indeterminate sherds of pottery and a fragmentary human tooth. Other cists contained no pottery at all, but concealed skeletal remains. One megalith yielded a gold ring and microliths.

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| (1) | TF-179 Megalithic. Charcoal
Trench KKR-1-A, 0-III, pit E
sealed by layer 1, depth 0.7 m.
Field no. KKR.1 (v) -63/1502.
<i>Current Science</i> , 35, 1, 1966, pp. 4-5 and
<i>Radiocarbon</i> , 8, 1966, pp. 442-52. | 195+90 (200+95) B.P.
1750+95 A.D. |
| (2) | TF-183 Megalithic (?) Charcoal
Trench KKR-II, SAI, 0-14,
Layer 4, depth 0.76 m.
Field no. KKR-II (v) 63/1507
<i>Current Science</i> , 34, 2, 1965, pp. 42-43 and
<i>Radiocarbon</i> , 7, 1967, pp. 291-95. | 200+95 (205+100) B. P.
1745+100 A.D. |

Dates are younger than expected and vary very much from archaeological estimates.

XXIX

Site : KALIBANGAN

District : Ganganagar

Lat : 29° 05' N

Long : 74° 05' E

The site was excavated by the Archaeological Survey of India.

The site is situated on the left bank of the Ghaggar (ancient Sarasvati) and consists, like the type site of Harappa and Mohenjo-daro, of twin mounds—citadel and the lower city, here the latter was also enclosed by a massive wall of mud-bricks.

Two cultural periods, period I and II representing pre-Harappan and Harappan were distinguished.

Period I : The ceramics of the period are as below :

(i) A red ware, turned on wheel without much of attention and bearing painted designs in black or occasionally in white; the main design repertoire being bands, loops, jointed arches and latticed triangles.

(ii) A well-executed red ware with rusticated or roughened lower portion.

(iii) A sturdy red ware – chiefly basin—with obtusely incised pattern on the interior and with single or multiple chord patterns on the exterior.

(iv) A purplish red made of fine paste with smooth slip. Paintings were in black pigment. Designs were neatly executed and comprised horizontal bands, loops, criss-cross, metopes, latticed loops or pendant triangles, palm tree, double-axe motif, etc.

(v) A ware with buff or reddish-buff slip. Designs on this pottery, painted in black, sometimes in purple and rarely in white, comprised horizontal bands, oblique lines with fronds, sigmas, borders of scales both lattice or plain, loops, etc.

(vi) A grey ware with paintings in black as well in white.

Some of the sherds bore graffiti marks. A few of the designs were similar to those of comparable age from Sind-Baluch area viz., Amri, Kot-Diji pre-Harappan, etc.

Other finds included small blades of chalcedony and agate, occasionally serrated or backed: beads of steatite, shell, carnelian terracotta, and copper; shell bangles, a bull, toy-cart wheel, annular rings, bangles both single and jointed variety of terracotta; querns and mullers of stone; bone point; and celt, bangle and cutting tool of copper.

Houses were of mud-bricks. The size of the bricks and the orientation of the houses differed from that of the succeeding Harappans. A few plastered storage pits inside houses were also noticed. The pre-Harappan settlement noticed in the citadel mound was also enclosed within a massive brick wall.

An interesting discovery was a field with furrow marks.

Period II Harappan : Ceramics were characteristic of the Indus sites and consisted of both plain and painted varieties. Shapes comprised the Indus goblets with pointed bases, perforated jars, dishes-on-stands, beakers, perforated handled cups, tall jars, globular vessels, etc. Potsherds bearing the Indus script and graffiti were also found. Painted designs on pottery also typically Indus, comprised intersecting circles, scales, pipal leaves, rosettes, etc.

Minor antiquities consisted of chert blades; Indus seals, sealings, terracotta cakes, triangular, circular and irregular nodules; human and animal figures of terracotta; beads of steatite, carnelian, jasper, faience and copper besides, copper objects.

The citadel, a rhomboid structure, was divided into two—southern and northern halves. In the south were the platforms with steps to reach them. Structures over the platform were not well-preserved. Noteworthy discovery was a group of fire alters on the platform. Such fire alters were also found in houses in the lower city. Entry into the citadel was from north and south. The northern half of the citadel was the residential area.

Settlement in the lower city was characteristically chess board pattern of the Indus cities with main streets and cross lanes, wells, houses with steps, etc. Flooring was of rammed clay, though rarely paved with tiles.

Animals known were the Indian domestic humped cattle, Indian buffalo, pig, *barasingha*, Indian elephant, camel, domestic ass, rhino, *chetal*, fowl, etc.

The burials found here were of three types viz., extended inhumation in rectangular/oval pits; pot-burials without skeletal remains in circular pits; and pottery deposit in rectangular/oval pits.

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|-----|---|---|
| (1) | TF-155 pre-Harappan Period I. Charcoal
Trench KLB 1, ZB2, layer 9B, depth 3.40 m.
Field No. KLB-1, ZB2, /C/1962-63-3.
<i>Current science</i> , 37, 4, 1968, pp. 96-99 and
<i>Radiocarbon</i> , 8, 1966, pp. 442-52. | 4195 $\pm$ 115 (4320 $\pm$ 120)B.P.
2370 $\pm$ 120 B.C. |
| (2) | TF-157 Pre-Harappan Period I. Charcoal
Trench KLB-1, YF2, Qdt. 3,
layer 5, depth 1.2 m.
Field No. KLB-1, YF2/C/1962-63-7
<i>Current Science</i> , 37, 4, 1968, pp. 96-99 and
<i>Radiocarbon</i> , 7, 1967, pp. 291-95. | 4120 $\pm$ 110 (4240 $\pm$ 120)B.P.
2290 $\pm$ 120 B.C. |

- (3) TF-241 Pre-Harappan Period I. Charcoal
Trench KLB-1, XD1, Qdt 1, pit 4
sealed by layer 2, depth 2.75 m.
Field no. KLB-1, XD1/C/1963-64-1
Current Science, 37, 4, 1968, pp. 96-99 and
Radiocarbon 8, 1966, pp. 442-52
4090 $\pm$ 90 (4205 $\pm$ 95) B.P.
2255 $\pm$ 95 B.C.
- (4) TF-160 Harappan Period II. Charcoal
Trench KLB-1, XC1, Qdt. 2, layer 12,
depth 3.65 m.
Radiocarbon, 7, 1967, pp. 291-95.
4060 $\pm$ 100 (4182 $\pm$ 105) B.P.
2232 $\pm$ 105 B.C.
- (5) TF-942 Harappan Period II. Charcoal
Trench KLB-2, XA1, Qdt. 4, layer 12,
depth 3.45 m. Field no. 1967-68/4/KLB-2
Indian Archaeology 1969-70-A Review,
pp.63-69
4055 $\pm$ 100 (4175 $\pm$ 115) B.P.
2225 $\pm$ 115 B.C.
- (6) TF-162 Pre-Harappan Period I. Charcoal
Trench KLB-1, XE1, Qdt. 2,
pit sealed by layer 3, depth 1.85 m.
Field no. KLB 1, XE1/C/1962-63-12
Current Science, 37, 4, 1968, pp. 96-99 and
Radiocarbon, 7, 1967, pp. 291-95
3940 $\pm$ 100 (4055 $\pm$ 105) B.P.
2105 $\pm$ 105 B.C.
- (7) TF-161 Pre-Harappan Period I. Charcoal
Trench KLB-1, YF 2, Qdt. 2,
layer 3, depth 1.4 m.
Field no. KLB-1, YF2/C/1962-63-11
Current Science, 37, 4, 1968, pp. 96-99 and
Radiocarbon, 7, 1967, pp. 291-95
3930 $\pm$ 100 (4045 $\pm$ 105) B.P.
2095 $\pm$ 105 B.C.
- (8) TF-25 Harappan Period II
Charcoal with charred bones
Trench KLB-2, Square F,
F 1-2.15 x F 2-8.20 m.
depth 0.37 m.
The Proceedings of the Indian Academy of Sciences,
LVIII, 3, Section A, 1963, pp. 141-52 and
Radiocarbon, 5, 1963, pp. 273-82
3930 $\pm$ 110 (4045 $\pm$ 115)
2090 $\pm$ 115 B.C.
- (9) TF-607 Harappan Period II
Charred wheat and charcoal
Trench KLB-2, A8, Qdt.2,
layer 18, depth 4.10 m.
3930 $\pm$ 120 (4040 $\pm$ 125) B.P.
2090 $\pm$ 125 B.C.

- Field no. KLB-2, A8/C/1965-66-9
Current Science, 37, 4, 1968, pp. 96-99 and
Radiocarbon, 10, 1968, pp. 131-43.
- (10) TF-163 Harappan Period III. Charcoal
 Trench KLB-1, YE 1, Qdt. 4,
 layer 2 R, depth 0.47 m.
 Field no. KLB-1, YE1/C/1962-63-13
Current Science, 37, 4, 1968, pp. 96-99 and
Radiocarbon, 7, 1967, pp. 291-95. 3910 $\pm$ 100 (4030 $\pm$ 105) B.P.
 2080 $\pm$ 105 B.C.
- (11) TF-153 Harappan Period II. Charcoal
 Trench KLB2, XB7, Qdt 2, hearth
 sealed by layer 1, depth 0.25 m.
 Field no. KLB2, XB7/C/1962-63-20.
Current Science, 37, 4, 1968, pp. 96-99 and
Radiocarbon, 8, 1966, pp. 442-52 3910 $\pm$ 110 (4025 $\pm$ 110)
 2075 $\pm$ 110 B.C
- (12) TF-608 Harappan Period II
 Charred wheat
 Trench KLB-2, A6, Qdt. 2,
 layer 18, depth 4.5 m.
 Field no. KLB-2, A6/C/1965-66-10
Current Science, 37, 4, 1968, pp. 96-99 and
Radiocarbon, 10, 1968, pp. 131-43. 3910 $\pm$ 110 (4025 $\pm$ 110) B.C.
 2075 $\pm$ 110 B.C.
- (13) TF-145 Harappan Period II
 Charcoal with earth
 Trench KLB-2, XA8, Qdt. 3, layer 14,
 depth 2.25 m.
 Field no. KLB-2, XA8/C/1962-63-10
Current Science, 33, 9, 1964, pp. 266-69.
 and *Radiocarbon*, 6, 1964, pp. 226-232. 3895 $\pm$ 100 (4010 $\pm$ 105) B.P.
 2060 $\pm$ 105 B.C.
- (14) P-481 Harappan Period II. Charcoal
 Trench KLB-2, layer 3
Radiocarbon, 5, 1963 pp. 82-103. 3879 $\pm$ 72 (4005 $\pm$ 74) B.P.
 2055 $\pm$ 74 B.C.
- (15) TF-147 Harappan Period II
 Charcoal with earth
 Trench KLB-2, E1, Qdt. 1,
 layer 23, depth 5.00 m.
 Field no. KLB-2, E1/C/1962-63-13.
Current Science, 33, 9, 1964, pp. 266-69 and
Radiocarbon, 6, 1964, pp. 226-32. 3865 $\pm$ 100 (3980 $\pm$ 105) B.P.
 2030 $\pm$ 105 B.C.

- (16) TF-948 Harappan Period II
wood Charcoal
Trench KLB-2, C5, Qdt. 3,
layer 22, depth 3.10 m.
Field no. 1967-68/22/ KLB-2
Indian Archaeology 1969-70-A-Review, pp. 63-69.
3815 $\pm$ 100 (3930 $\pm$ 100) B.P.
1980 $\pm$ 100 B.C.
- (17) TF-605 Harappan Period II
Charcoal
Trench KLB-1, ZB 9, Qdt. 3, layer 10,
depth 1.65 m.
Field no. KLB-1, ZB 9/C/1965-66-7
Current Science, 37, 4, 1968, pp. 96-99. and
Radiocarbon, 10, 1968, pp. 131-43.
3810 $\pm$ 105 (3925 $\pm$ 110) B.P.
1975 $\pm$ 110 B.C.
- (18) TF-165 Pre-Harappan Period I
Charcoal. Trench KLB-1, XD1, Qdt. 1 and 2,
layer 2 R, depth 2.35 m.
Field no. KLB-1, XDI/C/1962-63-15
Current Science, 37, 4, 1968, pp. 96-99 and
Radiocarbon, 7, 1967, pp. 291-95.
3800 $\pm$ 100 (3915 $\pm$ 105) B.P.
1965 $\pm$ 105 B.C.
- (19) TF-151 Harappan Period II
Charcoal with earth
Trench KLB-2, E1. Qdt. 1, layer 7,
depth 3.10 m.
Field no. KLB-2, E1/C/1962-63-17
Current Science, 33, 9, 1964, pp. 266-69 and
Radiocarbon, 6, 1964, pp. 226-32.
3800 $\pm$ 100 (3910 $\pm$ 115) B.P.
1960 $\pm$ 115 B.C.
- (20) TF-139 Harappan Period II
Charcoal with earth
Trench KLB-2, XA 8, Qdt. 2, layer 6,
depth 0.95 m.
Field no. KLB-2, XA8/C/1962-63-2
Current Science, 33, 9, 1964, pp. 266-69 and
Radiocarbon, 6, 1964, pp. 226-32.
3775 $\pm$ 100 (3880 $\pm$ 105) B.P.
1930 $\pm$ 105 B.C.
- (21) TF-947 Harappan Period II
Wood charcoal
Trench KLB-2, C 5, Qdt. 3, layer 34,
depth 5.20 m.
Field no. 1967-68/21/KLB-2.
3765 $\pm$ 85 (3875 $\pm$ 90) B.P.
1925 $\pm$ 90 B.C.

- (22) TF-150 Harappan Period II.
Charcoal with earth
Trench KLB-2, ZE1, Qdt. 4, layer 6,
depth 1.35 m.
Field no. KLB-2, ZE1/C/1962-63-16
Current Science, 33, 5, 1964, pp. 266-69 and
Radiocarbon, 6, 1964, pp. 226-32. 3740 $\pm$ 100 (3850 $\pm$ 105) B.P.
1900 $\pm$ 105 B.C.
- (23) TF-156 Pre-Harappan Period I
Charcoal. Trench KLB-1, XE1, Qdt. 1,
layer 2, depth 0.8 m.
Field no. KLB-1, E1/C/1962-63-5
Current Science, 37, 4, 1968, pp. 96-99 and
Radiocarbon, 8, 1966, pp. 442-52 3740 $\pm$ 105 (3850 $\pm$ 110) B.P.
1900 $\pm$ 110 B.C.
- (24) TF-141 Harappan Period II
Charcoal. Trench KLB-2, A7, Qdt. 3,
layer 7, depth 1.64 m. Field no. KLB 2,
A7/C/1962-63-6
Current Science, 37, 4, 1968, pp. 96-99 and
Radiocarbon, 8, 1966, pp. 442-52. 3705 $\pm$ 110 (3810 $\pm$ 115) B.P.
1860 $\pm$ 115 B.C.
- (25) TF-149 Harappan Period II
Charcoal. Trench KLB-2, ZE 1, Qdt. 4.
layer 3, depth 0.65 m.
Field no. KLB-2, ZE1/ C/1962-63-15
Current Science, 37, 4, 1968, pp. 96-99 and
Radiocarbon, 8, 1966, pp. 442-52. 3675 $\pm$ 140(3780 $\pm$ 145) B.P.
1830 $\pm$ 145 B.C.
- (26) TF-986 Harappan Period II
Wood charcoal
Trench KLB-2, C 5, Qdt . 3,
layer 34, depth 5.2 m.
Field no. 1967-68/21/KLB-2
Indian Archaeology 1969-70-A Review, pp. 63-69 3675 $\pm$ 87 (3775 $\pm$ 90)B.P.
1925 $\pm$ 90 B.C.
- (27) TF-154 Pre-Harappan Period I
Charcoal
Trench KLB-1, ZC 2, layer 8,
depth 2.7 m. Field no. KLB-1,
ZC2/C/1962-63-2
Current Science, 37, 4, 1968 pp. 96-99 and
Radiocarbon, 7, 1967, pp. 291-95 3665 $\pm$ 110 (3770 $\pm$ 115) B.P.
1820 $\pm$ 115 B.C.

- (28) TF-142 Harappan Period II. Charcoal. Trench KLB-2, XB8, Qdt. 4, layer 4, depth 1.15 m.
Field No. KLB-2, XB8/c/1962-63-7
Current Science, 37, 4, 1968, pp. 96-99 and
Radiocarbon, 8, 1966, pp. 442-52
3635 $\pm$ 100 (3740 $\pm$ 105) B.P.
1790 $\pm$ 105 B.C.
- (29) TF-152 Harappan Period II. Charcoal
Trench KLB-2, XB9, Qdt. 4, layer 4, depth 0.95 m
Field no. KLB-2, XB9/C/1962-63-18
Current Science, 37, 4, 1968, pp. 96-99
Radiocarbon, 8, 1966, pp. 442-52
3615 $\pm$ 85 (3720 $\pm$ 90)
1770 $\pm$ 90 B.C.
- (30) TF-240 Pre-Harappan Period I. Charcoal
Trench KLB-1, XD1, Qdt. 1, pit 3, sealed by layer 3, depth 2.50 m.
Field no. KLB-1, XD1/C/1963-64-1
Current Science, 37, 4, 1968, pp. 96-99 and
Radiocarbon, 8, 1966, pp. 442-52.
3610 $\pm$ 110 (3715 $\pm$ 115) B.P.
1765 $\pm$ 115 B.C.
- (31) Harappan Period II. Wood charcoal
Trench KLB-2, ZN1, Qdt. 1, layer 7, depth 2.25 m.
Field no. 1967-68/18/KLB2
Indian Archaeology 1969-70-A Review, pp. 63-69.
3605 $\pm$ 100 (3715 $\pm$ 105) B.P.
1765 $\pm$ 105 B.C.
- (32) TF-143 Harappan Period II. Wood
Trench KLB-2, YA1, Qdt. 3, layer 2, depth 0.25 m.
Field no. KLB-2, YA1/C/1962-63-8
Current Science, 37, 4, 1968, pp. 96-99 and
Radiocarbon, 8, 1966, pp. 442-52.
3510 $\pm$ 110 (3615 $\pm$ 110) B.P.
1665 $\pm$ 110 B.C.
- (33) TF-244 Harappan Period II. Charcoal
Trench KLB-2, E2, Qdt. 4, layer 2, depth 0.35 m.
Field no. KLB-2, E2/C/1963-64 - 4.
Current Science, 37, 4, 1968, pp. 96-99 and
Radiocarbon, 8, 1966, pp. 442-52.
3250 $\pm$ 90 (3340 $\pm$ 95) B.P.
1390 $\pm$ 95 B.C.
- (34) TF-138 Harappan Period II. Charcoal
Trench KLB-2, A7, Qdt. 4, layer 3, depth 0.9 m.
3075 $\pm$ 100 (3165 $\pm$ 105) B.P.
1215 $\pm$ 105 B.C.

Field no. KLB-2, A7/C/1962-63-1
Current Science, 37, 4, 1968, pp. 96-99 and
Radiocarbon, 8, 1966, pp. 442-52

- (35) TF-599 Animal Bones 1930 $\pm$ 100 (1987 $\pm$ 105) B.P.
37 $\pm$ 105 B.C.
 Trench KLB-2, XA 17, Qdt. 1, layer 4,
 depth 0.70 m. Field no. KLB2/XA17-
 Qdt. 1/C/1965-66 - 1
Radiocarbon, 11, 1, 1969, pp. 188-93.

Date of TF-599 is erroneous and the sample appears to be contaminated.

XXX

Site : KARLE

Lat : 18° 45' N

District : Pune

Long : 73° 29' E

State : Maharashtra

General : The Buddhist caves of Karle, Bhaja and Bedsa are situated in the Bhore Ghat. The caves at Bhaja, Bedsa and Karle are in the 'spurs that strike out from the hills into the tableland'. These are isolated groups and comprise mainly a *chaitya* cave, *viharas* and some detached cells. The prominent feature among these is the *chaitya*.

The rock caves fall within a time bracket of 250 B.C. - A.D. 100.

The caves here derive their name from the nearest village, Karle and are on the western flank of the spur just above the village. The group comprises a large *chaitya* and small *viharas*. The roof of the *chaitya* is very interesting. It is semi-circular in section and is ornamented even today by wooden ribs which are coeval with the excavation of the caves. This substantiates that the roof is not a 'copy of masonry arch' but is based on timber construction.

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- (1) BM-92 Historical. Wood 2240 $\pm$ 150 (2307 $\pm$ 155) B.P.
357 $\pm$ 155 B.C.
 From a pin holding together the ceiling
 beams of middle third of main *chaitya* cave
Radiocarbon, 3, 1961, pp. 39-45
- (2) TF-185 Historical. Wood. 2180 $\pm$ 95 (2245 $\pm$ 95) B.P.
295 $\pm$ 95 B.C.
 From *chaitya* cave no. 8
Current Science, 35, 11, 1966, pp. 276-78 and
Radiocarbon, 8, 1966, pp. 442-52.

- (3) TF-171 Historical. Wood 2075 ± 100 (2135 ± 100) B. P.
 From an inside rib fitted into wall of the rock 285 ± 100 B. C.
Current Science, 34, 13, 1965, pp. 394-97 and
Radiocarbon, 8, 1966, pp. 442-52.

XXXI

Site : KAUSAMBI

Lat : 25°20' N

District : Allahabad

Long : 81° 23' E

State : Uttar Pradesh

This site was excavated by the University of Allahabad over several years.

The site is located on the left bank of the Jamuna. The ruins extended over an area of ten square miles (25.89 sq. km.) and the accumulated debris is nearly 32 feet (9.5 m.)

Excavation revealed that the fortification here is pre-Mauryan. The mud rampart had a brick revetment and showed several phases of reconstruction, rebuilding and strengthening. The fortification with gateways, guard-rooms, etc., was surrounded by a deep ditch. Inside the fort area were exposed several building complexes both religious and secular viz., the Goshitarama monastery, *Seyenachiti*, the palace-complex, etc. As many as twenty-five structural levels (including five prestructural ones) have been discerned. These levels concern the — NBP and the post-NBP periods. Brick-built houses, drains, sewage system indicated by terracotta ring-wells and soakage jars were found. Besides nine roads and lanes were also exposed. Important antiquities comprised copper cast coins, local coins viz., the lanky bull type of Kausambi, coins of Mitra and Magha and Naga kings, seals and sealings etc.

Based on analysis of the ceramics the accumulation can be divided into five cultural periods. Ceramic contents of each period is as follows.

Period I : Pottery from this level is entirely fragmentary and worn out. This is so particularly from the area of defences. Yet some of the types which could be made out are similar to those found in the OCP (Ochre Coloured Pottery) levels at Atranjikhhera.

Period II : This is represented by a red ware, wheel-made, sturdy and turned out of well-levigated clay. It has a bright red slip with orange red core. Shapes in this included bowls, dishes, basins, dish on stand, etc. Some of these bear paintings in black on the rim. Other ceramics in this level are a coarse black and black-and-red wares turned on a slow-wheel. Some of these are painted in white on black slip. A

few show bright red or black slip. Sherds of black-and-red ware are fragmentary. Sherds of a ware grey to buff in colour showing a black slip were also found. Occasional paintings were also observed on this. A few sherds showed paring marks even.

Classification of the cultural milieu into periods I and II is not very clear.

Period III : The period is distinguished by the occurrence of the Painted Grey Ware. In some of the grey ware sherds a black slip is seen. Painted designs comprised horizontal bands, groups of verticals or slanting strokes on the body, loops, circles, circles of dots, etc. The PGW here represents its last stages. Associated with this ware is a black-and-red ware which is better fired than its counterpart in the previous period. Other wares were coarse black, and coarse black-and-red. Some of the sherds showed external chocolate and internal black slip. Painted designs on this were dots, circles of dots, horizontal incisions and grooves filled with white colour and horizontal lines and grooves in black on a chocolate surface. On one of the specimens was seen a stylized human being. These and the PGW overlapped into the succeeding NBP levels. The PGW at this site, according to the author, represents an eastern branch.

Period IV : The level is marked by the emergence of the NBP Ware. This ware is a local industry and was produced on a mass scale. It is available in black (most prolific) steel grey, chocolate, orange and golden colours. Some specimens showed double colour, one on either side internal or external or on the same side one on the upper region and the other on the lower. Bowls and dishes are the common shapes. Lids, vases and carinated *handis* are other forms in this Ware. Associated with the NBP is a grey ware, thick, coarse in surface and is comparable to those from Hastinapur period III. Some of these sherds bore paintings in black. A few shapes are similar to those obtained in the NBP. Shapes included bowl-forms, dish, *handi*, vase, basins etc. Another ware coeval with the NBP is the red ware of medium fabric with particles, of straw, husk and sand in the body-clay. Normally this had a red slip. Shapes in this comprised mainly of utilitarian value. Vessels showed soot stain indicating cooking. Varieties of bowls, dish, basins, vase, vase-cum-bowl, jar, bowl-dish shaped lids, tumbler, and hollow cylindrical stands were the shapes.

Period V : This is characterised by the complete absence of the NBP. The ceramic contents of this period is mainly a red ware of high finish, fabric and firing. The body clay was the local *kabis* containing high percentage of iron. At a later time of this period a new ware—chocolate slipped red—was seen. This ware is a distinct entity. Besides, some black slipped ware was also present. These are different from these coeval with the NBP. In this period vases carinated at the waist are to be seen for the first time. *Surahis* are the imported types. Some of the shapes indicate a Saka-Parthian influence. Shapes observed were bowl, dish, basin, *handi*, vase, jar-*surahi*, spouted vessels, spouted *surahi*, inkpot lid, goblet, ring stand, hollow-stand, incense burner, etc. Decorations consisted of horizontal grooves, lozenges, triangles,

with grooves, zig zag incisions, wavy bands, triangles with creepers, oblique strokes, stars, *amalaka* spirals, circles, pipal, fish-scale patterns, cheque patterns, converging lines *triratna*, nail, finger tip, etc. From this level were obtained nearly 600 coins belonging to the Mitra, Magha, Kushan and Nagas. Most important is a seal of Kanishka.

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|---|--|
| <p>(1) TF-221 N.B.P. levels, Period IV
Charcoal
Trench KSB I-III-R-D, 5-7, pit B sealed by layer 12, depth 4.3 m.
Field no. KSB/63/AP-15.
<i>Current Science</i>, 34, 13, 1965 pp. 394-397 and
<i>Radiocarbon</i>, 8, 1966, pp. 442-52.</p> | <p>2385+100 (2450+105) B.P.
500+105 B.C.</p> |
| <p>(2) TF-219 N.B.P. middle levels, Period IV
Charcoal
Trench KSB-I-III-RD, 2-7, Road I, depth 3 m.
Field no. KSB/63/AP-9
<i>Current Science</i>, 34, 13, 1965 pp. 394-97 and
<i>Radiocarbon</i>, 8, 1966, pp. 442-52.</p> | <p>2325+100 (2390+100) B.P.
440+100 B.C.</p> |
| <p>(3) TF-103 N.B.P. last phase, Period IV
Charcoal
Trench KSB-GR, YZ 2, 2-3, pit C sealed by layer 18A BK, depth, 3 m.
Field no. KSB/63/GR-106.
<i>Current Science</i>, 34, 2, 1965, pp. 42-43 and
<i>Radiocarbon</i>, 7, 1967, pp. 291-95</p> | <p>2295+105 (2360+110) B.P.
410+110 B.C.</p> |
| <p>(4) TF-225 N.B.P. early phase, period IV
Charcoal
Trench KSB-GR, YZ 3, 1-2, layer 11, depth 1.6 m.
Field no. KSB/63/GR-136
<i>Current Science</i>, 34, 13, 1965, pp. 394-97 and
<i>Radiocarbon</i>, 8, 1966, pp. 442-52.</p> | <p>2285+105 (2350+110) B.P.
400+110 B.C.</p> |
| <p>(5) TF-105 NBP middle phase, Period IV,
Charcoal
Trench KSB-GR, YZ2, 1-2,</p> | <p>2210+110 (2285+115) B.P.
335+115 B.C.</p> |

pit A sealed by layer 21 BK,
depth 2.4 m.
Field no. KSB/63/GR-108
Current Science, 34, 2, 1965, pp. 42-43 and
Radiocarbon, 7, 1967, pp. 291-95

- (6) TF-100 NBP last phase, Period IV
Charcoal
Trench KSB-GR, YZ2, 1-2,
pit A sealed by layer 18A BK,
depth 2.15 m.
Field no. KSB/63/GR-103
Current Science, 33, 9, 1964, pp. 266-69 and
Radiocarbon, 6, 1964, pp. 226-232
 2160 ± 95 (2225 ± 100) B.P.
 275 ± 100 B.C.
- (7) TF-104 NBP middle phase, Period IV
Charcoal
Trench KSB-GR, YZ 2, 2-3,
layer 22 BK, depth 2.4 m.
Field no. KSB/63/GR-107
Current Science, 34, 2, 1965, 42-43 and
Radiocarbon, 7, 1967, pp. 291-95
 2150 ± 105 (2220 ± 110) B.P.
 270 ± 110 B.C.
- (8) TF-226 NBP levels, Period IV
Charcoal
Trench KSB-GR, YZ 3, 1-3, layer 12,
depth 1.8 m.
Field no. KSB/63/GR-138
Current Science, 34, 13, 1965, pp. 394-97
and *Radiocarbon*, 8, 1966, pp. 442-52.
 2110 ± 95 (2170 ± 100) B.P.
 220 ± 100 B.C.
- (9) TF-96 Post NBP levels, Period V
Charcoal with earth
Trench KSB I-III-RD; 4-6,
Road IV, depth 2.03 m.
Field no. KSB/63/AP-4.
Current Science, 33, 9, 1964, pp. 266-69. and
Radiocarbon, 6, 1964, pp. 226-32.
 2005 ± 95 (2065 ± 100) B.P.
 115 ± 100 B.C.
- (10) TF-94 Post N.B.P. levels, Period V
Charcoal with earth
Trench KSB I-III-RD, 4-5,
 1945 ± 90 (2000 ± 95) B.P.
 50 ± 95 B.C.

- Road VI, depth 1.33 m.
Field no. KSB/63/AP-2
Current Science, 33, 9, 1964, pp. 266-269 and
Radiocarbon, 6, 1964, pp. 226-32.
- (11) TF-95 Post N.B.P. Period V
Charcoal with earth
Trench KSB I-III-RD, 4-6,
Road V, depth 1.44 m.
Field no. KSB/63/AP-3
Current Science, 33, 9, 1964, pp. 266-69 and
Radiocarbon, 6, 1964, pp. 226-32. 1840 $\pm$ 115 (1900 $\pm$ 120) B.P.
50 $\pm$ 120 A.D.
- (12) TF-93 Early roads Period V
Charcoal with earth
Trench KSB I-III-RD, 3-5,
layer 4, depth 1.25 m.
Field no. KSB/63/AP-1
Current Science, 33, 2, 1964, pp. 40-42 and
Radiocarbon, 6, 1964, pp. 226-232. 1655 $\pm$ 105 (1705 $\pm$ 110) B.P.
245 $\pm$ 110 A.D.
- (13) TF-97 Early roads, Period V
Charcoal with earth
Trench KSB I-III-RD, 2-5,
layer 6, depth 1.65-1.7 m.
Field no. KSB/63/AP-5
Current Science, 33, 2, 1964, pp. 40-42 and
Radiocarbon, 6, 1964, pp. 226-232. 1640 $\pm$ 105 (1690 $\pm$ 110) B.P.
260 $\pm$ 110 A.D.
- (14) TF-98 Early roads, Period V
Charcoal with earth
Trench KSB, GR, E6, XXXIII-XXXIV
pit sealed by layer 2, depth 1.25 m.
Field no. KSB/63/GR-101.
Current Science, 33, 9, 1964, pp. 266-69 and
Radiocarbon, 6, 1964, pp. 226-32. 1470 $\pm$ 90 (1515 $\pm$ 95) B.P.
435 $\pm$ 95 A.D.

Dates show a high degree of inconsistency. For a detailed discussion please see stratigraphy and chronology of Kausambi : A reassessment in *Journal of Andhra Historical Research Society* (in Press) by the author.

Site : KAVERIPATTANAM (Kilayur)

Lat : 11°77' N

District : Thanjavur

Long : 79° 08' E

State : Tamil Nadu

Excavated by the Archaeological Survey of India.

Digging revealed a massive brick platform built on the natural soil and measuring 18.28 × 7.62 m. In one of the corners, remains of two wooden posts planted close to the structure were noticed. The structure was perhaps a wharf. Size of the bricks recalled similar bricks of the Ikshvaku levels at Nagarjunakonda, District Guntur, Andhra Pradesh. Associated with the structure and in contemporary layers were found megalithic Black-and-red Wares.

TF-207 Early Historical
(Black-and-red ware deposits)

2200 $\pm$ 100 (2266 $\pm$ 103) B.P.
316 $\pm$ 103 B.C.

Wood

Trench KLR-1, A2, layer 4, depth 1.25 m.

Radiocarbon, 10, 1968, pp. 131-43.

XXXIII

Site : KAYATHA

Lat : 23° 30' N

District : Ujjain

Long : 76° 00' E

State : Madhya Pradesh

Excavation was conducted by the Vikram University, Ujjain in the first season and later on jointly by the Vikram University and the Deccan College and Post Graduate Research Institute, Pune.

The site is located on the banks of the Choti-Kali-Sindh and is 24.14 km. east of Ujjain on the Ujjain-Maski road.

Two trenches—A on the periphery and B on the Gadh mounds were laid.

Five periods of occupation were distinguished.

Period I Kayatha culture – (c. 2200–2000 B.C.) : In this period three distinct ceramic industries were encountered : (a) a sturdy ware normally with a slip from rim to shoulder, sometimes seen up to the base and painted in violet pigment. Shapes met with were jars, storage jars and bowls. Majority of the pots had ring bases. A few had disc bases as well (b) A buff ware of well levigated clay and painted in red pigment. The walls were thin and fabric fine. Most common shape was the *lota*. (c) A plain red ware devoid of slip or wash and decorated with incised patterns executed by a comb like instrument. Design repertoire consisted of multiple zig zags, chevrons, etc. A coarse handmade ware with incised and applique designs was also present.

Microliths consisted of blades, points, crescents, etc.

Two necklaces made of 175 and 160 carnelian, agate and crystal beads, were an important find. Most of the beads were long barrel and short bicone beads. A jar containing 40,000 micro-beads was another important find.

Two axes and 28 bangles were the copper objects associated with this period.

Houses were of mud.

The site was deserted for about a century, represented by a sterile layer of 15–20 cm. after this period.

Period II (c. 1900–1600 B. C.) : This period is marked by the arrival of entirely a new set of people.

The white painted black-and-red ware comparable with those of the Banas Valley appeared in this period.

Microliths were represented by blades, points, etc. A noteworthy feature in this period was the occurrence in large numbers of terracotta bull figurines both naturalistic and highly stylised. The stylised ones depicted the hump, horn and had either a rounded or pedestalled base. These are without parallels.

Other finds included necklaces of short cylinder shell beads, terracotta short bicone beads with punctured patterns.

Evidence of large scale burning was noticed.

Period III – The Malwa complex with black on red ware and microliths makes its appearance. The bull figurines of the earlier periods continued.

There is an overlap between periods II and III. The site was abandoned for about 6–7 centuries as represented by a sterile layer of black soil.

Period IV : (6th cen. B.C. to 2nd cen. B.C.) : Pottery consisted of plain red wares of the historical times, a few sherds of plain grey ware comparable probably with P.G.W. reported earlier. A few sherds of N.B.P. were found in the upper level.

This period represented a full fledged iron using culture.

Other antiquities were beads of semi-precious stones, spool like ear ornament of jasper, bone points, copper antimony rods and iron implements.

Houses were of burnt bricks.

Period V (2nd cent. B.C. – 6th cent. A.D.) : The main ceramic industry was a coarse plain red ware. An ivory bottle and cast coins were found. A number of structures were encountered. A large structure with several rooms, bath room and arrangement for draining water was an interesting feature.

The site remained in occupation in post-Gupta period as well as evidenced by sculptural fragments and remains of medieval temples.

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- | | | |
|-----|--|---|
| (1) | TF-680 Kayatha culture, Period I
Charcoal. Trench KTH-3,
layer 13, Field No. 21
<i>Current Science</i> 38, 1, 1969, pp. 4-6
<i>Radiocarbon</i> , 11, 1, 1969, pp. 188-93 and
<i>Indian Archaeology</i> 1967-68-A Review, pp. 69-72 | 3850 $\pm$ 90 (3965 $\pm$ 100) B.P.
2150 $\pm$ 100 B.C. |
| (2) | TF-400 Ahar culture, Period II
Charcoal
Trench KTH-1, layer 38, depth 9.60 m.
Field No. 9
<i>Current Science</i> , 38, 1, 1969, pp. 4-6 and
<i>Radiocarbon</i> , 10, 1968, pp. 131-43. | 3800 $\pm$ 105 (3915 $\pm$ 110) B.P.
1965 $\pm$ 110 B.C. |
| (3) | TF-781 Ahar Culture, Period II (?)
Charcoal
Trench A, layer 9,
Field No. 976
<i>Current Science</i> , 38, 1, 1969, pp. 4-6.
<i>Radiocarbon</i> , 11, 2, 1969, pp. 502-508 and
<i>Indian Archaeology</i> 1967-68-A review, pp. 69-72. | 3720 $\pm$ 105 (3830 $\pm$ 105) B.P.
1880 $\pm$ 105 B.C. |
| (4) | TF-779 Ahar Culture, Period II (?)
Charcoal | 3685 $\pm$ 105 (3790 $\pm$ 110) B.P.
1840 $\pm$ 110 B.C. |

- Trench A, layer 7.
Field No. 693
Current Science, 38, 1, 1969, pp. 4-6;
Radiocarbon, 11, 2, 1969, pp. 502-508 and
Indian Archaeology 1968-69-A Review, pp. 71-73.
- (5) TF-780 Ahar Culture, Period II (?) 3680 $\pm$ 95 (3785 $\pm$ 100) B.P.
1835 $\pm$ 100 B.C.
Charcoal
Trench A, layer 8.
Field No. 697
Current Science, 38, 1, 1969, pp. 4-6;
Indian Archaeology 1967-68-A Review, pp. 69-72
and *Radiocarbon*, 11, 2, 1969, pp. 502-508
- (6) TF-777 Ahar Culture, Period II (?) 3625 $\pm$ 95 (3730 $\pm$ 100) B.P.
1780 $\pm$ 100 B.C.
Charcoal
Trench A, layer 5.
Field No. 361
Current Science, 38, 1, 1969, pp. 4-6;
Indian Archaeology 1967-68-A Review,
pp. 69-72 and
Radiocarbon, 11, 2, 1969, pp. 502-508
- (7) TF-396 Malwa Complex, Period III 3575 $\pm$ 105 (3680 $\pm$ 110) B.P.
1730 $\pm$ 110 B.C.
Charcoal
Trench KTH-1, layer 32, depth 7.80 m.
Field No. 5
Current Science, 38, 1, 1969, pp. 4-6 and
Radiocarbon, 10, 1968, pp. 131-43.
- (8) TF-778 Ahar Culture, Period II (?) 3550 $\pm$ 95 (3655 $\pm$ 95) B.P.
1705 $\pm$ 95 B.C.
Charcoal
Trench A, layer 6.
Field No. 599.
Current Science, 38, 1, 1969, pp. 4-6;
Indian Archaeology 1967-68-A Review, pp. 69-72
and *Radiocarbon*, 11, 2, 1969, pp. 502-508
- (9) TF-678 Kayatha Culture, Period I 3530 $\pm$ 100 (3635 $\pm$ 100) B.P.
1685 $\pm$ 100 B.C.
Charcoal
Trench KTH-4, layer 18.
Field No. 19
Current Science, 38, 1, 1969, pp. 4-6;
Radiocarbon, 11, 1, 1969, pp. 188-93 and
Indian Archaeology 1967-68-A Review, pp. 69-72.

- (10) TF-399 Ahar Culture, Period II
Charcoal
Trench KTH-1, layer 37,
depth 9.1 m. Field No. 8.
Current Science, 38, 1, 1969, pp. 4-6 and
Radiocarbon, 10, 1968, pp. 131-43. 3525 ± 100 (3625 $\pm$ 100) B.P.
 1675 ± 100 B.C.
- (11) TF-398 Malwa Complex, Period III
Charcoal from burnt house
Trench KTH-1, layer 35, depth 8.5 m.
Field No. 7
Radiocarbon, 11, 1, 1969, pp. 188-93. 3520 ± 100 (3620 $\pm$ 103) B.P.
 1670 ± 103 B.C.
- (12) TF-974 Malwa Complex, Period III
Charcoal
Trench KTH-B, layer 19,
Field No. KTH-B, 1466
Current Science, 41, 1, 1972, pp. 478-79 and
Indian Archaeology 1969-70-A Review, pp. 63-69. 3485 ± 95 (3585 $\pm$ 100) B.P.
 1635 ± 100 B.C.
- (13) TF-776 Malwa Complex, Period III
Charcoal
Trench A, layer 4,
Field No. 111.
Current Science, 38, 1, 1969, pp. 4-6;
Radiocarbon, 11, 2, 1969, pp. 502-508 and
Indian Archaeology 1967-68-A Review, pp. 69-72. 3455 ± 110 (3555 $\pm$ 115) B.P.
 1605 ± 115 B.C.
- (14) TF-397 Malwa Complex, Period III
Charcoal
Trench KTH-1, layer 33, depth 9.60 m.
Field No. 7.
Current Science, 38, 1, 1969, pp. 4-6 and
Radiocarbon, 10, 1968, pp. 131-43. 3350 ± 100 (3450 $\pm$ 100) B.P.
 1500 ± 100 B.C.
- (15) TF-405 Kayatha Culture, Period I (?)
Charcoal
Trench KTH-2, layer 10, depth 3.5 m.
Field No. 14.
Current Science, 38, 1, 1969, pp. 4-6 and
Radiocarbon, 11, 1, 1969, pp. 188-93. 3320 ± 100 (3415 $\pm$ 100) B.P.
 1465 ± 100 B.C.
- (16) TF-402 Malwa Complex, Period III
Charred wheat
Trench KTH-1, layer 35, 3240 ± 100 (3330 $\pm$ 100) B.P.
 1380 ± 100 B.C.

Field No. 11.

Current Science, 38, 1, 1969, pp. 4-6 and

Radiocarbon, 10, 1968, pp. 131-43.

- (17) TF-401 Ahar Culture, Period II
Charcoal
Trench KTH-1, layer 39, depth 10 m.
Field No. 10
Current Science, 38, 1, 1969, pp. 4-6 and
Radiocarbon, 10, 1968, pp. 131-43.
 3190 ± 105 (3285 ± 105) B.P.
 1335 ± 105 B.C.
- (18) TF-676 Malwa Complex, Period III
Burnt wheat grains
Trench KTH-4, layer 14.
Field No. 17
Current Science, 38, 1, 1969, pp. 4-6;
Indian Archaeology-1967-68-A Review, pp. 69-72
and *Radiocarbon*, 11, 1, 1969, 188-93
 3160 ± 105 (3255 ± 185) B.P.
 1305 ± 105 B.C.
- (19) Ahar Culture, Period II
Charcoal
Trench KTH-3, layer 9.
Field No. 20
Current Science, 38, 1, 1969, pp. 4-6;
Radiocarbon, 11, 1, 1969, pp. 188-93 and
Indian Archaeology 1967-68-A Review, pp. 69-72.
 3155 ± 130 (3250 ± 135) B.P.
 1300 ± 135 B.C.
- (20) TF-394 N.B.P. levels, Period IV
Charcoal
Trench KTH-1, layer 23, depth 5.8 m.
Field No. 2
Radiocarbon, 10, 1968, pp. 131-43.
 2380 ± 95 (2450 ± 97) B.P.
 500 ± 97 B.C.
- (21) TF-674 N.B.P. levels, Period IV
Charcoal
Trench KTH-4, layer 11
Field No. 15
Radiocarbon, 11, 1, 1969, pp. 188-93 and
Indian Archaeology 1967-68-A Review, pp. 69-72
 2350 ± 95 (2420 ± 100) B.P.
 470 ± 100 B.C.

In the sample level of TF-674 sherds of P.G.W. were also found.

XXXIV

Site : KODEKAL

Lat : 16° 21' N

District : Gulburga

Long : 76° 24' E

State : Mysore

Excavated by K. Paddayya

The ashmound here is oval on plan with a maximum diameter of 36 m. and rising to an average height of 3.6 m. above the surrounding ground level.

Excavations revealed a sequence of seven layers, the composition of which are given below.

1. scoriaceous slag due to burning of dung over-lying an ashy band;
2. dark brownish soil;
3. again a scoriaceous slag;
4. variegated dark brownish soil;
5. rammed murum;
6. grey/black earth, and
7. natural soil represented by a whitish murum.

All the layers excepting 5, which is a floor-level, yielded ground stone tools, stone blades of the neolithic context and pottery. However, proliferation of finds was in layers 4 and 6.

TF-748 Neolithic

Charcoal

Trench 2, layer 4, depth 2-3 m.

Field No. 948

Indian Archaeology 1969-70-A Review and
Radiocarbon, 11, 2, 1969, pp. 502-508

4285 $\pm$ 105 (4410 $\pm$ 105) B.P.
2460 $\pm$ 105 B.C.

XXXV

Site : KOLAR GOLD MINES

Lat : 12° 55' N

District : Kolar

Long : 78° 15' E

State : Mysore

TF-879

1460 ± 110 (1500 ± 115) B.P.

Wood

450 ± 115 A.D.

Old workings, No. 2 Shaft area, 50 m. level

Indian Archaeology 1969-70-A Review, pp. 63-69

From this level bones, pottery and wood were found.

XXXVI

Site : KORKAI

Lat : 8° 38' N

District : Tirunelveli

Long : 78° 03' E

State : Tamilnadu

Excavated by the Department of Archaeology, Government of Tamilnadu.

The site, however, was first excavated by Dr. Caldwell in 1827.

Five trenches KRK-I to V were laid.

Excavation revealed continuous occupation from megalithic to modern times.

Ceramic contents were Black-and-red, plain red, red slipped, black slipped and locally manufactured Rouletted Wares from lower levels.

At KRK I at a depth of 2.22 m. a broken urn and from the upper levels a coin of Raja Raja Chola were recovered.

At KRK II urns containing post-excarnated bones were found.

KRK III-trench in the middle of the lake revealed foundations of a medieval structure.

In a trench in the middle of the village (KRK IV) a brick platform with a flight of steps and beneath it three terracotta rings placed one above the other in the fashion of soakage jars were brought to light. The intervening space between the

foundation trench and the rings were filled with conch shells, potsherds, etc. Inscribed potsherds bearing Tamil (?) letters assignable to 1st century A.D. were found.

At KRK V two sets of soakage jars, inscribed potsherds, pearl-oyster shells were found.

Other antiquities from the site included sherds bearing grafitti marks, beads of terracotta and crystal; terracotta figurine (torso), bone ear-studs, arrow-heads, objects of copper and iron, perforated tiles; and triangular discs of terracotta and potsherds.

TF-987 Early Historical (?)

Wood

2680 $\pm$ 90 (2755 $\pm$ 95) B.P.

805 $\pm$ 95 B.C.

Locus : O-I, layer 5, depth 3.17 m.

Field No. KRK-1.

Indian Archaeology 1969-70—*A Review*, pp. 63-69.

XXXVII

Site : KOTIA

Lat : 24°55' N

District : Allahabad

Long : 82°25' E

State : Uttar Pradesh

A megalithic site excavated by the University of Allahabad.

Five burial monuments were opened of which three were cists, one a cist within a cairn and one cairn-circle.

The rectangular cist-chambers were usually oriented east-west and were about 60 cm. deep. The walls were of small stones piled up in two or three courses along the sides of the pit. The cists had no floor slabs. Inside chambers were filled up with small pieces of stones. Variations in the cists indicated by the division of the chamber into three compartments without any intercommunication (Meg. I) were noticed. Another cist enclosed by stone rubble (Meg. IV) had on the top of the cairn an exact replica of the cist below.

The stone-circle concealed a rectangular pit 60 cm. deep with longer axis along east-west.

Pottery consisted of black-and-red, dull black or grey Wares of thick fabric. Shapes included bowl or dish, sharply carinated cooking vessels, knobbed lids, big elliptical storage jars etc., and skeletal remains were mostly of domestic animals. Excepting for a few rib pieces, human bones were absent.

- | | | |
|-----|---|--|
| (1) | TF-319 Megalithic
Charcoal
Meg. II, depth 0.1m. to 0.55 m.
Field No. KTA(A)64/3502.
<i>Radiocarbon</i> , 10, 1968, pp. 131-43. | 2135+100 (2220+105) B.P.
270+105 B.C. |
| (2) | TF-321 Megalithic
Charcoal
Meg. V, depth 0.25 m. to 0.35 m.
Field No. KTA(A)64/3502
<i>Radiocarbon</i> , 10, 1968, pp. 131-43. | 965+100 (995+100) B.P.
955+100 A.D. |
| (3) | TF-322 Megalithic
Charcoal
Meg. VA, depth 0.15 m. to 0.25 m.
Field No. KTA(A)64/3506
<i>Radiocarbon</i> , 10, 1968, pp. 131-43. | 570+95 (590+98) B.P.
1360+98 A.D. |
| (4) | TF-320 Megalithic
Charcoal
Meg. IV, depth 0.15 m. to 0.6 m.
Field No. KTA(A)64/3504
<i>Radiocarbon</i> , 10, 1968, pp. 131-43. | 480+95 (494+98) B.P.
1456+98 A.D. |
| (5) | TF-318 Megalithic
Charcoal
Meg. I, depth 0.15 m. to 0.30 m.
Field No. KTA(A)64/3501
<i>Radiocarbon</i> , 10, 1968, pp. 131-43. | 220+95 (226+98) B.P.
1724+98 A.D. |

Except TF-319, the rest do not give archaeologically acceptable date. For detailed discussion of this please see K.S. Ramachandran's 'Chronology of the Indian Megaliths - some considerations,' *Puratattva*, 3, 1969-70, pp.107-109.

XXXVIII

Site : LALITPUR

Lat : 24°42' N

District : Jhansi

Long : 78°25' E

Excavated by the Archaeological Survey of India.

Digging was done in two localities I & II at Ahatrapal temple area and at the head of a tributary of the Baina Nullah respectively.

Locality I turned out to be a disturbed tool bearing deposit.

In locality II at the eastern upper slope of the Betwa terrace confined to 1250 feet (381 m.) contour contains quartzite and granite pebbles.

The tool spread is noticed in the cultivated field, mainly on the left bank of the river.

The implementiferous bed of *kankar* mixed with brownish soil and rounded sub-gravel is very thin and practically exposed to surface.

Tools, both full and partially prepared occurred on the top of black soil or partially submerged into it.

Tools and cores were of quartzite, sandstone and quartz. Implements of quartzite were pre-dominant on the western slope of the terrace towards Betwa and those of granite on the eastern slope.

At Durjanpur near Lalitpur Station microliths were found.

Microliths were mostly on chalcedony, agate and rarely on crystalline quartz and tool-types were small blades, flakes, cores, scrapers and points of non-geometric type.

Sequence of layers in the excavated trench from bottom upwards is as follows:

Bedrock at 70 cm. compact reddish-yellow soil yielding microliths and slightly loose reddish humic soil formed the top layer.

TF-55 Stone Age (?)

Charred wood.

Trench 1, layer 2, depth 0.2 m.

Field No. 1.

The Proceedings of the Indian Academy of Sciences

LVIII, 3, Section A, 1963, pp. 141-52 and

Radiocarbon, 5, 1963, pp. 273-82

3930 $\pm$ 115 (4040 $\pm$ 125) B.P.

2090 $\pm$ 125 B.C.

Along with the sample palaeolithic tools were found.

XXXIX

Site : LANGHNAJ

Lat : 23°37' N

District : Mehsana

Long : 72°32' E

State : Gujarat

Excavations were conducted by the Deccan College and Post Graduate Research Institute, Pune in the sand dunes of sub-recent times.

Three phases, initial, middle and late, were distinguished.

The pottery used by the people living in the sand dunes comprised an ill-baked pottery of local sandy clay turned on wheel or a turn-table. Some bore incised decoration while some others bore a red slip. Shapes consisted of bowls and small storage jars.

Evidence for intentional use of fire was absent.

No structural remains were encountered. It may be surmised that the people used wind screens of reeds and thickets of babul trees.

These were hunter-fishing folk.

Besides other things, rats, squirrel, fish and tortoise formed the dietary of the people. Bones were cut longitudinally and cross-wise for extracting marrow. The carcass of animals was brought to the dunes and butchered. Making of microliths and butchering were the main occupations of the people.

The dead were buried in a flexed position with the knee almost doubled up and kept under buttocks; preferred orientation was east-west with the head lying on its right. Intentional burial of wolf with its head smashed indicates some sort of ritual.

Dolicocephalic with a fairly large cranial capacity, long stature, thin legs, pronounced supra-orbital ridges, slight prognathism of the mouth and perhaps a snub nose were the physical features of the people who were of mixed race—Mediterranean and Veddid features.

The climate was mostly dry.

In the initial phase the people used microliths, ill baked-pottery and hunted rhino, deer, etc. Sheep and dog was probably unknown. The dead were buried in a highly flexed position and the wolf was buried with the human body. The burial was within the kitchen debris and was oriented east-west.

In the middle phase heavier stone tools, ring stone, macehead and even ground axes were in existence.

In the later phase red and black pottery, microliths and copper knife were found.

The initial phase can be dated to before 2500 B.C. while the later to about 2000 B.C.

TF-744 Microlithic phase
middle/late phase

3875 ± 105 (3990 ± 110) B.P.
 2040 ± 110 B.C.

Bones

Trenches B, F, G and C; depth 1.2 to 1.8 m.

Field Nos. R 3828, 3921, 4707, 4326 and 5188

Radiocarbon, 11, 1969, pp. 180-93 and

Indian Archaeology 1967-68-A Review, pp. 69-72

The dating laboratory has commented that samples from lower and middle levels were mixed before running sample. It also observes that 'contamination probability is high'.

XL

Site : LEKHAHIA

Lat : 24°0' N

District : Mirzapur

Long : 82°32' E

State : Uttar Pradesh

Excavation was carried out by the Allahabad University.

Three open-air and two Rock-shelters were tackled.

Two of the open-air shelters yielded similar results in an one metre thick deposit, comprising nine layers; the finds therefrom being as follows :

Layers 8 and 7 yielded microliths viz., parallel sided blades, blunted backed blades, points, lunates, scrapers, cores and unfinished tools. The last two represent the earliest phase.

Layer 4 to 1 yielded geometric microliths viz., triangles, trapezes, and pottery which increased in each succeeding layer.

Results may be summarised as follows:

Phase I consisting of non-geometric pre-pottery heavily patinated microliths; Phase II geometric as well as non-geometric microliths; Phase III consisted of geometric microliths with pottery and Phase IV geometric and dimunitive microliths with pottery.

Rock-shelters contained paintings, which on the basis of style, colour and technique can be grouped into more than one. The paintings were in outline drawing, hatched or solidly filled.

In the first Rock-shelter, where the occupational deposit was nearly 42 cm. thick, seventeen skeletons were found in extended position, one in each grave. The graves yielded plenty of microliths, flakes, cores, etc.

On the basis of stratification, overlap and superimposition eight occupational phases could be discerned. Of the 17 skeletons four belonged to phase IV, three to V, two to VI and one each for rest of the five. Three skeletons were found in much damaged condition.

Earliest skeleton was associated with non-geometric microlith and pre-pottery phase, the rest with both non-geometric and geometric microliths. Some skeletons were found in association with laterite nodules and ochre. This discovery would suggest a link between the buried people and the paintings.

In the second Rock-shelter the deposit was about 20 cm. consisting of geometric microliths and pottery.

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| <p>(1) TF-419 Microliths phase
Bones
Rock-shelter I, Skeleton No. XVII, 4-7,
layer 8, depth 0.4 m.
Field No. LKH (M) RS-1/64/64/B-4
<i>Radiocarbon</i>, 11, 1, 1969, pp. 188-93</p> | <p>4240$\pm$110 (4367$\pm$113) B.P.
2417$\pm$113 B.C.</p> |
| <p>(2) TF-417 Microlithic phase
Bones
Rock-shelters I, skeleton VI, 5-7,
layer 4, depth 0.15 m.
<i>Current Science</i> 36, 21, 1967, pp. 566-68 and
<i>Radiocarbon</i>, 11, 1969, pp. 188-93</p> | <p>3560$\pm$105 (3660$\pm$110) B.P.
1710$\pm$110 B.C.</p> |

- (3) TF-342
Charcoal
Trench LKH(M) RS-I, pit B,
sealed by layer 1, depth 0.10 m.
Field No. LKH (M) 64/3005.
Radiocarbon, 10, 1968, pp. 131-43.
 180 ± 110 (185 ± 113) B.P.
 1765 ± 113 A.D.
- (4) TF 341
Charcoal
Trench LKH(M) RS I, pit A,
sealed by layer 1, depth 0.12 m.
Field No. LKH(M)64/3004.
Radiocarbon, 10, 1968, pp. 131-43.
 155 ± 90 (160 ± 92) B.P.
 1790 ± 92 A.D.
- (5) TF-343
Charcoal
Trench LKH (M) RS-I, pit B,
sealed by layer, 1, depth 0.15 m.
Field No. LKH(M)64/3006.
Radiocarbon, 10, 1968, pp. 131-43.
 140 ± 90 (144 ± 92) B.P.
 1806 ± 92 A.D.
- (6) TF-344, 349, 341 and 342 - all modern
Charcoal
Trench LKH(M) RS-II, pit B.
sealed by layer 1, depth 0.10 m.
Field No. LKH(M)64/3007.
Radiocarbon, 10, 1968, pp. 131-43.

According to the excavator, the rock-shelters, were being used by present-day shepherds even. Hence the charcoal samples appear to have been contaminated with modern charcoal.

The dates of charcoal samples from TF-342 onwards are not worth consideration.

XLI

Site : LOTHAL

District : Ahmedabad

Lat : $22^{\circ}31'$ N

Long : $72^{\circ}15'$ E

Excavated by the Archaeological Survey of India over several years.

The occupational debris rose to about 22 feet (6.7 m.)

The accumulation is divisible into two phases – A and B. Likewise the structures are grouped into five phases I to V. Of these phases I to IV pertain to cultural phase A, structural phase B, belongs to cultural phase B. The cultural phases represent a mature Harappan and Late or degenerate Harappan culture. Each of the structural phases is separated by a flood debris; the greater intensity of flood being at the end of phase III and IV.

Along with the usual Harappan wares in Phase A, a micaceous red ware and a black-and-red ware were found. These two, however, continue in phase B as well. Shapes in the both wares were similar and included convex-sided bowls with or without stud handles, round bottomed jars with flaring rims; jars and dough plates were in coarse grey ware. Painted designs in the micaceous red ware were black dots, strokes, wavy lines, horizontal bands, hatched diamonds and wheat chaff. The forms found in these two wares are not found in the Indus Valley. In the black-and-red, which was limited in occurrence white wavy line design was the normal feature.

In the other Harappan ware painted patterns comprised leaf patterns, scales, chequers, hatched panels, peacocks, pipal palm, rosettes, filled and hatched triangles, wavy lines, honeycomb, dancing peacock, stag under a tree, accacia, corn chaff, water birds, etc.

In phase B of Lothal certain distinguishing factors of separation from phase A are noticeable. Among pottery forms, the small necked jar with a bulbous body transformed into one with a high neck and round base, the convex sided bowls developed carination at the shoulder and dishes were devoid of carination. Small dish-on-stand with solid stem appeared. Goblets, beakers, and perforated jars completely disappear. In painting on the ceramics also a variation can be seen. The paintings are not carefully executed and, more often than not, are confined to the upper half of the vessel. Often occurring design repertoire comprised horizontal bands, oblique and flowing wavy lines in groups, fronds, hatched triangles, circles etc. Likewise the occurrence of seals also decrease. In Lothal A, 216 seals were found while in Lothal B only 5 were available. Again in the latter phase animal motifs and pictographs disappear.

Other finds at Lothal included copper objects, important among which are a dog, hare, amulets with bird, hair pin with bird-head, ear and finger rings and bangles. Terracotta human and animal figurines of which only nine were human including a mother goddess were found; male figures were rare. One figure showed Sumerian affinities. Animal figures included domesticated, animals viz., humped and humpless

cattle, dog, ram, pig, rhino, and horse. Playthings were toy-carts, marbles, wheeled animals, spinning tops, discs, etc. Other miscellaneous objects were bangles, shells, and terracotta beads, ear and nose rings of gold, micro beads of gold, steatite nose rings with screw rods of ivory, terracotta gamesman, etc. No stone sculpture was found.

Burials were typically Harappan. However, in Phase III double burials comprising a male and a female were observed.

City planning was in the Harappan pattern with houses in a straight lines. Some of the important structures exposed were :

(a) *Dock* : The dockyard measured 299×37 m. north-south and east-west respectively. The length was 2.5 km. Sides of the dock were supported by a number of mud-brick platforms. The western platform measuring 240 m. was also used for handling cargo. Boats entered through a channel. The dock had also a spillway channel. Marine shells were found from inside the dock.

On one of the eastern platforms twelve blocks formed the base of a granary with air vents. Up to Phase III this was perhaps the granary. But in Phase IV this was converted into a kiln for baking seals.

Artisans viz., bead-makers, shell and ivory workers and others lived in the Lower town.

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| <p>(1) TF-136 Mature Harappan, Phase A
Charcoal mixed with earth
Trench SRG 2, AX 33, layer 10,
depth 3.0 m. Field no. 78
<i>Current Science</i>, 33, 9, 1964, pp. 266-69 and
<i>Radiocarbon</i>, 7, 1967, pp. 291-95</p> | <p>3915 ± 130 (4030 ± 135) B.P.
2080 ± 135 B.C.</p> |
| <p>(2) TF-22 Mature Harappan, Phase A
Charcoal with soil
Trench SRG 2, E 13/9, sealing wall of
phase III, depth 1.88 m. Field no. 29.
<i>The Proceedings of the Indian Academy of Sciences</i>,
LVIII, 3, Section A, 1963, pp. 141-52 and
<i>Radiocarbon</i>, 5, 1963, pp. 273-82</p> | <p>3845 ± 110 (3960 ± 115) B.P.
1895 ± 115 B.C.</p> |
| <p>(3) TF-27 Mature Harappan, Phase A
Charcoal with mud and dirt
Trench SRG-2, D 13/7A, depth 1.98 m.
Field no. 39 A</p> | <p>3840 ± 110 (3950 ± 115) B.P.
2000 ± 115 B.C.</p> |

The Proceedings of the Indian Academy of Sciences,
LVIII, 3, Section A, 1963, pp. 141-52 and
Radiocarbon, 5, 1963, pp. 273-82

- (4) TF-26 Mature Harappan, Phase A 3830 $\pm$ 120 (3950 $\pm$ 125) B.P.
2000 $\pm$ 125 B.C.
Charcoal coarse and fine grain
Trench SRG 2, D 13/AA, depth 1.98-2.26 m.,
sample from flood debris and loam deposited
against wall of phase III B.
Field no. 32
The Proceedings of the Indian Academy of Sciences,
LVIII, 3, Section A, 1963 pp. 141-152 and
Radiocarbon, 5, 1963, pp. 273-82.
- (5) TF-133 Mature Harappan, Phase A 3740 $\pm$ 110 (3845 $\pm$ 115) B.P.
1895 $\pm$ 115 B.C.
Charcoal with earth
Trench SRG-2, AX 33, layer 6,
depth 1.37 m. Field no. 75.
Current Science, 33, 9, 1964, pp. 266-69 and
Radiocarbon, 7, 1967, pp. 291-95
- (6) TF-29 Mature Harappan, Phase A 3740 $\pm$ 110 (3845 $\pm$ 115) B.P.
1895 $\pm$ 115 B.C.
Charcoal with mud and dirt
Trench SRG-55, XII-XVIII/7,
depth 2.11 m., sample collected from
water logged cess-pool.
Field no. 53
The Proceedings of the Indian Academy of Sciences,
LVIII, 3, Section A, 1963, pp.141-52 and
Radiocarbon, 5, 1963, pp. 273-82.
- (7) TF-23 Late Harappan, Phase B 3705 $\pm$ 105 (3815 $\pm$ 110) B.P.
1865 $\pm$ 110 B.C.
Charcoal with mud and dirt
Trench SRG-54, XLIII-XLVIII/4,
depth 1.22 m. Sample collected from
post-hole of mud wall of phase VA
built on flood debris of phase IV i.e.
on Cultural phase A.
Field no. 28
The Proceedings of the Indian Academy of Sciences,
LVIII, 3, Section A, 1963, pp. 141-52 and
Radiocarbon, 5, 1963, pp. 273-82.

- (8) TF-19 Late Harappan, Phase B
 Charcoal with earth
 Trench SRG-11, 5 B, depth 2.19-2.25 m.
 Field no. 6
The Proceedings of the Indian Academy of Sciences,
 LVIII, 3, Section A, 1963, pp. 141-52 and
Radiocarbon, 25, 1963, pp. 273-82.
 3650 ± 135 (3750 ± 140) B.P.
 1800 ± 140 B.C.
- (9) TF-135 Mature Harappan, Phase A
 Charcoal with earth
 Trench SRG-2, AX 33, layer 9,
 depth 2.5 m. Field no. 77.
Current Science, 33, 9, pp. 266-69 and
Radiocarbon, 7, 1967, pp. 291-95.
 3405 ± 125 (3505 ± 130) B.P.
 1555 ± 130 B.C.

XLII

Site : MAHISDAL.

Lat : $23^{\circ}42'45''$ N

District : Birbhum

Long : $87^{\circ}41'33''$ E

State : West Bengal

Excavated by the Archaeological Survey of India.

The mound rises to a height of 5 m. of which nearly 2 m. forms the Cultural deposit divisible into two periods without any break.

Period I : The ceramic contents were black-and-red ware both plain and painted; paintings being in black as well as in white pigments; a few sherds of black painted red ware, red ware both plain and painted; paintings being in black as well as in white pigments; a few sherds of black painted red ware, red ware with incised fillets and black ware with incised and pinhole decorations. Shapes in pottery included lipped or channel spouted bowl, carinated bowl with splayed out flanged rim and convex-sided bowls with sagger base. Design repertoire comprised oblique strokes, sigmas and interconnected loops.

Other finds were microliths viz., scrapers, lunates, short blades, etc., flat copper celt with convex cutting edge; realistic phallus and tetrahedral objects of terracotta; pins, bangles and fragments of a comb made of bone; and beads of semi-precious stone and steatite.

Floors in this period were of beaten earth over a soling of rammed terracotta nodules. The houses were simple and plastered reed structures. A large quantity of charred rice was found scattered on a floor.

Period II : The ceramics of the earlier period, however, continued but in coarse fabric. Buff and Grey Wares were the new elements found in this period. Microliths also continued.

Other objects included arrow-and spear-heads, chisels and nails, ore and slag of iron; broken part of terracotta elephant in motion and clay sealings with two symbols.

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| <p>(1) TF-391 Chalcolithic Period I
Charcoal
Trench MDL-1, VII-VIII, pit 3
sealed by layer 5, depth 1.61 m.
Field no. MDL-1/C/64-3
<i>Current Science</i>, 38, 1, 1969, pp. 4-6 and
<i>Radiocarbon</i>, 10, 1968, pp. 131-43.</p> | <p>3235$\pm$105 (3330$\pm$155) B.P.
1380$\pm$105 B.C.</p> |
| <p>(2) TF-392 Chalcolithic, Period I
Charcoal
Trench MDL-1, IV-VI, layer 5,
depth 1.30 m.
Field no. MDL-1/C/64-4
<i>Current Science</i>, 38, 1, 1969, pp. 4-6 and
<i>Radiocarbon</i>, 10, 1968, pp. 131-43</p> | <p>2950$\pm$105 (3035$\pm$110) B.P.
1085$\pm$110 B.C.</p> |
| <p>(3) TF-390 Chalcolithic, Period I
Charred rice
Trench MDL-1, II-II, layer 4,
depth 1.45 m.
Field no. MDL-1/C/64-2
<i>Current Science</i>, 38, 1, 1969, pp. 4-6 and
<i>Radiocarbon</i>, 10, 1968, pp. 131-43.</p> | <p>2725$\pm$100 (2805$\pm$105) B.P.
955$\pm$105 B.C.</p> |
| <p>(4) TF-359 Early Iron Age, Period II
Charcoal
Trench MDL-1, XI' - XII', pit 2
sealed by layer 1 B, depth 0.55 m.
<i>Radiocarbon</i>, 10, 1968, pp. 131-43.</p> | <p>2665$\pm$105 (2642$\pm$108) B.P.
692$\pm$108 B.C.</p> |

XLIII

Site : MAINAHAI

Lat : 25°21' N

District : Allahabad

Long : 81°25' E

State : Uttar Pradesh

The excavation was a salvage operation conducted by the Allahabad University. An area measuring roughly 151 square metres was tackled.

Sixteen baked brick walls and two of stone, part of a huge building of a religious character came to light. Six structural phases in the brick walls were discerned. The two courses of the stone walls were set in iron spigots in square sockets.

Besides, over 300 sculptures and fragments comprising human, animal (bull, elephant, lion, etc.) pillars and other architectural fragments were recovered. The capitals and pillars were very much similar to Mauryan workmanship in polish and composition and with some new features not found in the Asokan examples.

Ten fragmentary inscriptions were also recovered from the debris of later period; these are divisible palaeographically into post-Mauryan and Gupta periods.

The occupation itself can be dated to c. 4th century A.D.

TF-347 Historical

Charcoal

Trench MNH/BWN-1, 0-3,
layer 6 N, depth 0.75 m.

Field no. MNH/64/901

Current Science, 35, 11, 1966, pp. 276-78
and *Radiocarbon*, 10, 1968, pp. 131-43.

1420 $\pm$ 95 (1460 $\pm$ 95) B.P.
490 $\pm$ 95 A.D.

XLIV

Site : MALVAN

Lat : 21°07' N

District : Surat

Long : 72°42' E

State : Gujarat

Excavated by the Archaeological Survey of India.

The 1.3 m. thick deposit revealed the existence of two cultural periods; the first relating essentially to Late to Post Harappan and the second to early Medieval.

Ceramic contents of the first period comprised a red, buff, black-and-red, lustrous red, chocolate and coarse wares. In the last variety several sherds with graffiti marks were found. No paintings were seen. All the wares co-occurred. Perforated jars were found in the red and the chocolate wares; more frequent in the last mentioned.

Associated finds were blades of jasper, agate, chalcedony, bloodstone, with a high ratio of cores to flakes and almost devoid of retouched specimens; copper/bronze objects including bangles and small rod; terracotta circular and bun shaped cakes; terracotta humped bulls, and beads of paste and carnelian.

Bones of animals in various stages of mineralization representing domestic cattle, sheep, goat, dog, pigs, deer, wild *barasingha*, birds and fish were found.

Structural vestiges were a ditch running east-west traced to a length of 18 m. with its width 1.5 m. and measuring 1.1 m. in depth. The ditch was cut into the natural and its sides tapered to 30°. The dug out earth was spread on its banks. The northern side was banked to form a mud brick structure: the size of the bricks being $27 \times 17 \times 9$ cm. On the south bank of the ditch several pot-holes spaced at a uniform distance of 2.8 m. were seen indicating perhaps the presence of a fence. In the filling of the ditch a number of cattle bones were seen.

TF-1084	Late to Post-Harappan Period I	2675 $\pm$ 90 (2750 $\pm$ 95) B.P.
Charcoal		800 $\pm$ 95 B.C.
Trench MVN-IC, layer 3A, depth 1 m.		
<i>Current Science</i> , 41, 13, 1972, pp. 478-79		
<i>Indian Archaeology</i> 1970-71— <i>A Review</i> (cyclostyled)		

XLV

Site : MOHANUR

Lat : 10°30' N

District : Salem

Long : 79°05' E

State : Tamilnadu

Explored by the Government Museum, Madras.

This is an urn-burial site without any lithic appendage. However, this is assignable to the megalithic culture-complex. The sample was collected from a disturbed urn-burial.

TF-77	Megalithic	330 $\pm$ 100 (340 $\pm$ 105) B.P.
Bones		1610 $\pm$ 105 A.D.
From urn-burial		
<i>Current Science</i> , 33, 2, 1964, pp. 40-42 and		
<i>Radiocarbon</i> , 6, 1964, pp. 226-232		
Date is not acceptable.		

XLVI

Site : NAGARA

Lat : 24° 41' 15" N

District : Kaira

Long : 72° 38' 31" E

State : Gujarat

Excavated by the M.S. University of Baroda, Vadodra.

Cuttings were made at Varai – Mata – Dhado and Ratankhad. Three occupational periods were discerned beginning from c. 5th century B.C. to 15th century A.D.

Period I : (5th cent. B.C. to the beginning of Christian Era) : Pottery consisted of black-and-red, plain red and burnished red and NBP Wares.

Other finds included arrow-heads of iron, points, chisel-like objects and arrow-heads of bone, shell bangles, terracotta figurines including that of a mothergoddess and beads of terracotta. The bone objects were found in different stages of manufacture. A punch-marked copper coin was also found.

Period II (c. 1st cent. to 9th cent. A.D.) : This period is distinguished by the advent of the Red Polished Ware, Roman amphorae, besides the burnished red, black-and-red and a non-descript micaceous wares.

Antiquities of this period consisted of knives, blades and arrow-heads of iron; beads of terracotta, glass and semi-precious stones, coins of copper, silver and lead, gold foils, terracotta human and animal figurines, shell bangles, seal and sealings of terracotta showing a cow and a calf; potsherds inscribed with Brahmi characters and images of stone.

Structural activities are evidenced in the form of brick structures, mud floorings and a number of hearths.

Remains of rice and *kodarava* indicate the food habits in this period.

Period III : (after a lapse of several centuries—c. 15th cent. A.D.) : Pottery consisted of medieval glazed black and burnished red wares. Tiles, half-round in shape were also noticed.

- (i) TF-364 Period II
Charcoal
Trench NGR II, III, layer 16
depth 4.40 m. Field no. 1949
Current Science, 35, 11, 1966, pp. 276-78
and *Radiocarbon*, 10, 1968, pp. 131-43.
2030 $\pm$ 100 (2085 $\pm$ 105) B.P.
95 $\pm$ 105 B.C.
- (ii) TF-362 Period III
Charcoal
Trench NGR II, III, layer 13,
depth 3.30 m. Field no. 1947
Current Science, 35, 11, 1966, pp. 276-78
and *Radiocarbon*, 10, 1968, pp. 131-43.
1945 $\pm$ 90 (2000 $\pm$ 90) B.P.
50 $\pm$ 90 B.C.

The dates are very much divergent from archaeological estimation.

XLVII

Site : NAGARJUNAKONDA

Lat : 16° 31' N

District : Guntur

Long : 79° 14' E

State : Andhra Pradesh

The site was excavated by the Archaeological Survey of India for several years since 1954.

Excavations of the vast area of the valley revealed a cultural sequence from the Palaeolithic through microlithic, neolithic, megalithic to historical times.

Palaeolithic: Trenches laid in the north-western corner of the valley revealed the existence of remains of the Old Stone Age. Subsequently another site was also excavated in the same valley. Majority of the tools were cleavers and handaxes; ovates were also available. A subsequent blade-flake industry was also noticed. But there was clear time lag between the palaeolithic and the blade industry. The palaeoliths were characteristically Acheulian.

Microlithic: In some areas the presence of microliths was observed, which were normally unassociated with pottery. However, in one area some pottery was found. Pottery was largely with a brown slip and conformed to the traits of the neolithic pottery. The tools were mainly non-geometric; materials used were jasper, quartz, quartzitic chalcedony, agate, and crystal. There was a short blade industry also. Tool-types were points, burins, scrapers, lunates, crescentic points, awls besides fluted cores
RD-13x

and cores. A factory site was also located. The tools here were non-geometric and comprised retouched / unretouched blades, lunates, crescentic points, etc.

Neolithic : The neolithic site at Nagarjunakonda was located to the south-west of Nallarallabodu to the west of the road to the Museum. Excavation revealed implementiferous strata bearing celts, axes, etc. — in different stages of manufacture. Thick burnished grey ware, typical of the neolithic was also found.

An urn-burial containing the remains of a child was also discovered. Besides six neolithic graves were exposed. The bodies were in extended posture and oriented north-south. Towards the feet were found wheel / handmade burnished grey pots similar to those found in the habitation area. Most of the vessels were spouted and straight sided bowls. No other grave goods were found. The skeletons did not show any proper articulation.

Pots containing pottery, animal bones, microliths, flake tools, stone objects, polished stone axes, flakes of crystal, bone-tools, beads of paste, etc. were found. Some of the circular pits had post holes near the edge.

Ceramics of the neolithic period here comprised burnished grey, reddish brown and black and cream slipped wares. Interestingly some of the sherds contained ochre colour on the exterior akin to those found at Sanganakallu. Besides the typical neolithic shapes urns, deep bowls, shallow lid-cum-dish spouts were obtained. Pottery is mostly hand-made. Decorations consisted of simple incised oblique lines, leaf designs, bands and ribs. An oblong house (18' x 14') (5.48 x 4.26 m.) revealed in its centre two large pits (hearths) which yielded blunted butt axe, fabricators, fragmentary bones, potsherds, crystal microliths, etc. In another pit, skeleton of a deer was found.

Fragments of copper were also found in this level.

Megalithic : Megalithic culture here is represented mainly by the several characteristic burial monuments of the culture. Several of these were excavated. The types were mostly pit circles, cists enclosed by a stone-circle, etc. The burials entombed disarticulated human bones excepting in two where articulated inhumation was observed. In one burial remains of a sacrificed bovine was found. Besides animal bones were also found. Other furnishings comprised pottery, iron objects, etc. characteristic of this culture.

Historical : In the historical levels vestiges of *stupas*, *mahachaityas*, *chaitya* temples, etc., were exposed. Some of these are the Hariti temple, Ashtabhuja swami temple, a ghat on the Krishna bank, a monastic complex of *Aparamahavinaseliya* sect, palace complex, stadium, citadel, Asvamedha and burning ghat, besides number of secular structures, etc. Numerous inscriptions were also found. From this a Buddhist sect of Mahaviharaswamin of *Theravada-Vihayavada* are known.

Ceramic wares were black polished, red slipped, black-and-red wares, etc. Sprinklers, handles of Roman amphorae, storage jars, ceremonial pots, begging bowls, spouted vessels, etc. were found. From the surface, some sherds of celadon were also found.

Decorations consisted of spirals, *svastikas*, hatchures, Sun, criss-cross, rosettes, plaited courses, rainbows, chevrons, beads, crosses, scallops, herring bones, foliage etc.

Other antiquities included objects of terracotta, iron, copper, shell, glass, etc. Terracotta objects consisted of *mithunas*, Vaisravana, Hariti, Kartikeya, mother goddess, mother feeding child, horses, elephants, toy carts, *makaras*, *kundalas*, bullae etc. An important find was a bronze statue of Siddharta as an archer. Roman coins of Tiberius and Faustine the Elder, lead coins of Ikshvaku Chantamula, Virapurushadatta, copper coins of Pulomavi, Yajna Satakarni and Satakarni and silver coins of Vijayanagara kings were found.

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| <p>(1) TF-74 Neolithic
Soft and spongy human bones
Grave no. 8, skeleton no. 10,
depth 0.50 m.
<i>Current Science</i>, 33, 2, 1964, pp. 40-42 and
<i>Radiocarbon</i>, 6, 1964, pp. 226-32.</p> | <p>1900 ± 95 (1955 ± 100) B.P.
5 ± 100 B.C.</p> |
| <p>(2) TF-633 Neolithic
Soft and spongy human bones
Grave no. 5, skeleton no. 7,
depth 0.35 m.
<i>Current Science</i>, 33, 2, 1964, pp. 40-42 and
<i>Radiocarbon</i>, 6, 1964, pp. 226-32.</p> | <p>1750 ± 100 (1805 ± 105) B.P.
145 ± 105 A.D.</p> |
| <p>(3) TF-30 Neolithic
Animal Bones
Site 46, Sector NV, Division 362
Trench A-3, pit 44, depth 1.2-1.5 m.
<i>Current Science</i>, 33, 2, 1964, pp. 40-42 and
<i>Radiocarbon</i>, 6, 1964, pp. 226-32.</p> | <p>1535 ± 95 (1580 ± 100) B.P.
370 ± 100 A.D.</p> |
| <p>(4) TF-72 Neolithic
Soft and spongy human bones
Grave no. 6, skeleton no. 8
depth 0.52 m.
<i>Current Science</i>, 33, 2, 1964, pp. 40-42 and
<i>Radiocarbon</i>, 6, 1964, pp. 226-32.</p> | <p>1525 ± 95 (1570 ± 100) B.P.
380 ± 100 A.D.</p> |

- (5) TF-73 Neolithic
 Soft and spongy human bones
 Grave no. 4, skeleton no. 6, depth 0.40 m.
Current Science, 33, 2, 1964, pp. 40-42 and
Radiocarbon, 6, 1964, pp. 226-32
- 1495 $\pm$ 105 (1535 $\pm$ 100) B.P.
 415 $\pm$ 100 A.D.

Dates are not acceptable as they vary widely from archaeological estimates.

XLVIII

Site : NAVDA TOLI
District : Nimar
State : Madhya Pradesh

Lat : 22° 11' N
Long : 75° 36' E

Excavated by the Deccan College Postgraduate and Research Institute, Pune.

Navdatoli is located on the south bank of the R. Narmada; Maheshwar on the north bank. Several trenches were laid at both the sites. Excavations and exploration in and around these sites revealed seven cultural periods from Early Stone Age to Medieval times.

Period I—Early stone Age : Middle Pleistocene period : From the Narmada basin between Hoshangabad and Narsingpur a well-stratified handaxe-cleaver industry was noticed.

Period II—Middle Stone Age : In this period exclusive use of scrapers and flakes of chert, jasper, etc., (found *in situ* in the river gravels) was noticed. In the excavations cores of chert and jasper were found. The tool repertoire consisted of cores, side-end scrapers, point-cum-scraper, side and hollow scraper, double-hollow scraper-cum-point, borer-cum-scraper, retouched flakes etc. The distinct use of Levallois technique in the manufacture of the tools is worth noting. In short the industry is characterised by scrapers. However, angle-burins were also present.

Period III—Chalcolithic : The deposits of this period were found well-preserved at Navdatoli.

Habitation commenced right on the black cotton soil around first half of the first millennium B.C.

Predominant pottery was a red ware, usually painted in black but rarely in white pigment as well. Other varieties were white painted black-and-red, white slipped ware painted either in black or in vermillion black, greyish black, coarse red and black wares and a unique and rare tan ware.

The painted red ware had a slip of light yellowish brown to dark red ; surface was often worn out and turned on a slow wheel. Paintings were of uneven thickness. Designs were plain horizontal oblique bands, lattice and its variants, latticed diamonds, solid diamonds, hatched diamonds, latticed triangles, interlaced zig zags, wavy lines, intersecting verticals/horizontal arches, chevrons, solid double axes, concentric circles, concentric circles with dots, sun, crosses, human and animal motifs.

Shapes in pottery included large storage jars, narrow high necked vessels, bowls, dishes, bowls, and dishes-on-stand, carinated bowls, globular vessels, basins, etc.

Plain red ware was also available.

The designs in the white painted black-and-red pottery consisted of straight/oblique lines, overlapping triangles, vertical wavy lines accompanied with horizontal band/bands. Shapes in this ware included cups, or bowls, semi-circular bowls with carinated belly and dishes.

Painted designs in the white slipped ware were dancing human figures, wavy horned goats/deer, geometric designs comprising oblique lines, oblique rectangles, vertical wavy lines and solid black diamonds.

Shapes included bowls, cups and bowls—and dishes—on-stand. The unique type is the channel spouted vessel.

Shapes in the greyish black ware consisted of basins, dishes, bowls, vessels with narrow/broad neck and flaring rim, etc.

Incised designs in the pottery of the period comprised dots and strokes, simple and convex chevrons, zig zag, diamonds, etc.

Other antiquities included beads of agate, amazonite, carnelian, chalcedony, crystal, faience, glass, jasper, lapis lazuli, opal, paste, sandstone, shell, steatite, terracotta, zeolite, etc.; stoppers, skin rubbers, toys, ear-ornaments etc. of terracotta; rod, wire, and unfinished bead of copper; points and discs of bone; and shell bangles, saddle querns, etc.

Period IV—early historical : Pottery of the period consisted of a predominating red ware, the NBP slipped and burnished red and black-and-red wares.

Shapes were rimless bowl, dishes and basins in black-and-red, *kundas*, storage jars, pans, *pantis* and gourd shaped vessels in coarse red; rimless and carinated bowls, *surahi*, high short necked vessels in red slipped and burnished ware and globular vessels in coarse black wares.

Other finds included beads of semi-precious stones, sandstone, steatite and terracotta; stoppers, skin-rubbers, toys, etc., of terracotta; rod and wire of copper; arrow-head and hoe of iron, points, *khol* sticks, bangles, handles etc. of bone; bangles of ivory and shell; saddle quern etc.

Period V : This period is marked by the decrease in black-and-red and the predominance of red slipped wares. Besides a burnished red and tan ware also appear.

Shapes included lipped bowls and dishes in black-and-red; basins, bowls etc., in burnished red wares.

Other finds were stoppers, skin rubbers, toys, etc., of terracotta; arrow and spear-heads, nails, sickle, etc. of iron; points and handle of iron; shell bangles and saddle querns.

Building activities were evidenced by brick bats, tiles, etc. Period VI was mostly observed at Maheshwar.

Ceramic contents were black and red, both coarse and thin; coarse black slipped and slightly burnished red/wares besides the tan and red polished wares.

Shapes were lids, frying pans, saucer, bowl, dish, ridged bowls and wide mouthed vessels in coarse black; storage jars, bowls carinated vessels, *kundas*, lids, *surahi*, spouted pots, cylindrical cups, incense burners, miniature pots, etc.

Other finds included stoppers, skin-rubbers, crucibles, bangles, figurines, toys, etc., of terracotta; arrow, spear-heads, spike, sickle, chisel, knife, cylindrical objects of iron, etc., bangles and discs of glass; points, handle of dagger of bone; shell bangles; steatite lid and saddle querns.

A large brick structure with pebble and mortar foundations was an important structure unearthed.

Period VII—Muslim Maratha Period : Ceramic contents were coarse red, coarse black, burnished red, tan, glazed and celadon wares. Inscribed sherds and those with symbols were also found.

Other finds included beads of semi-precious stones, steatite, faience, terracotta; stoppers and toys of terracotta; copper rings; iron nails; points, *khol* sticks of bone; shell bangles; and whetstone and saddle querns.

(1) P-476 Chalcolithic, Period III
Charcoal
Trench I, A-17, layer 7,

4125 $\pm$ 69 (4249 $\pm$ 71) B.P.
2299 $\pm$ 71 B.C.

- depth 4' 2" (1.2 m.)
Field no. 82.
Radiocarbon, 5, 1963, pp. 82-103
- (2) P-202 Chalcolithic, Period III
Charcoal
Trench I, Subsquare A-18.
layer 6, *Radiocarbon*, 1, 1959, pp. 43-58. 3503 $\pm$ 128 (3608 $\pm$ 132) B.P.
1658 $\pm$ 132 B.C.
- (3) P-201 Chalcolithic, Period III
Charcoal
Trench II, Subsquare D, layer 8,
Radiocarbon, 1, 1959, pp. 43-58. 3492 $\pm$ 128 (3567 $\pm$ 132) B.P.
1617 $\pm$ 132 B.C.
- (4) P-200 Chalcolithic, Period III
Charcoal
Trench II, Subsquare W, layer 8
Radiocarbon, 1, 1959, pp. 43-58. 3457 $\pm$ 127 (3561 $\pm$ 131)
1611 $\pm$ 131 B.C.
- (5) P-475 Chalcolithic, Period III
Charcoal
From the earliest floor near 'S' section,
depth 6' 8" (2.03 m.)
Field no. 3570
Radiocarbon, 5, 1963, pp. 82-103 3455 $\pm$ 70 (3559 $\pm$ 72) B.P.
1609 $\pm$ 72 B.C.
- (6) P-204 Chalcolithic Period III
Trench I, Subsquare G, layer 3.
Radiocarbon, 1, 1959, pp. 43-58. 3449 $\pm$ 127 (3552 $\pm$ 130) B.P.
1602 $\pm$ 130 B.C.
- (7) TF-59 Chalcolithic, Period III
Charcoal
Mound IV, Trench IA 1, layer 9,
depth 2.75 m.
Field no. 1.
The Proceedings of the Indian Academy of Sciences,
LVIII, 3, Section A, 1963, pp. 141-52 and
Radiocarbon, 5, 1963, pp. 273-82. 3380 $\pm$ 105 (3475 $\pm$ 110) B.P.
1525 $\pm$ 110 B.C.
- (8) P-205 Chalcolithic, Period III
Burnt wheat
Trench I, Subsquare M, layer 2
Radiocarbon, 1, 1953, pp. 43-58. 3294 $\pm$ 125 (3393 $\pm$ 129) B.P.
1443 $\pm$ 129 B.C.,

XLIX

Site : NEVASA

Lat : 19° 34' N

District : Ahmednagar

Long : 74° 54' E

State : Maharashtra

Excavated by the Deccan College and Post Graduate Research Institute, Pune.

Six cultural periods ranging from the Early Stone Age to Medieval times were discerned.

Period I : Early Palaeolithic (Middle Pleistocene *c.* 1,50,000 years) : Tool-types viz., handaxes, cleavers, cores, hammerstones, flakes in mint condition and chopping tools were found in Locality V in the cemented gravel. Tools were made of the olivine dolerite, a variety of fine grained trap. A jaw fragment of *Bos nomadicus*, a typical mid pleistocene fossil was also found.

Period II : Middle palaeolithic (Upper Paleistocene *c.* 2500 years) : Tools of various types of scrapers and points were found from the overlaying cemented gravel. A complete skull of *Bos namadicus Falconer* was found embedded with tools. Though the fossil belongs to mid pleistocene the tools stratigraphically and typologically are later.

Period III : Neolithic-Chalcolithic *c.* 1500–1000 B.C: Pottery was wheel-made, of fine fabric with matt red surface painted in black pigment. Carinated bowls some having tubular spouts was a special shape. Painted designs on pottery consisted of figures of deer and other animals, painted realistically and in solid blacks. Incised designs were graffitti; impressed designs were peepal leaves, etc.

Other finds included microliths mainly on chalcedony occasionally on agate and jaspery chocolate coloured chert. Tool-types were cores, flakes with crested guiding ridge, plunging flakes, parallel-sided flakes, blades, penknife blades, blunted backed blades, lunates, triangles, trapezes, points, tanged points and blades with serrated edge. Stone celts, axes, adzes, hammerstones, anvils, etc.; chisels, poker, bangle and beads of copper/bronze ; sling stones and beads of burnt steatite, were also found.

People lived in mud houses with the wooden posts supporting the roof. Floors were of lime, hydraulic lime mortar with a bedding of gravel and hay.

The dead were buried under the floors in fully extended position or slightly flexed in shallow pits lined with lime or in jars placed horizontally into the pits. Children were buried in the following manner; (i) in single urns covered by bowls;

(ii) double urns placed horizontally face to face; (iii) double urns placed vertically face to face; and (iv) three urns, of which two were horizontally placed face to face and the third covering the broken bottom of the second. Orientation was north—north-east—south—south-west.

A gap in the occupation after this period was noticed.

Period IV : Early historical (c. 150–50 B.C.) : In this period the painted pottery tradition was completely forgotten. Pottery consisted of black-and-red, a coarse red and some NBP.

Iron was present. Other finds included beads of stone terracotta and glass; shell bangles; terracotta figurines and flesh rubber; four legged querns of stone and coins of the Satavahana and silver plated punch-marked coins. About 200 Satavahana coins of potin, lead and copper were recovered.

An important find was a unique seal of ivory with symbols like the *triratna*, *svastika* and twin fishes.

Six phases of occupation was noticed. Houses were of mud and large bricks. Floors were made of lime and hemp.

Period V : Late Early historical (Indo-Roman) 50 B.C.—200 A.D. : This was the most flourishing period. Ceramics of the period is marked by the appearance of the Red polished, Megarian-like-ware, the Rouletted ware, Amphroae and the Andhra Painted Pottery. Shapes were cups, sprinklers, small spouted *lotas*, etc.

Other finds were rotary querns, copper/bronze dish with an omphales or projection in the centre, late Satavahana coins viz., those of Gautamiputra and Yajna Satakarni and imitations of Roman bullae.

Houses were built of mud and rubble foundations. Walls were of brick and roofed with tiles fixed to wooden rafters with iron nails. Soak-pits constructed of wedge shaped bricks or terracotta rings were meant for sanitary conveniences.

Wheat, mung and bajri indicate food habits.

Perhaps they used *kardi* seed oil.

Period VI—Medieval (Muslim Maratha—c. 1400–1700 A.D.) : A long gap in the habitation was noticed after period V.

Ceramic contents were a coarse red and black pottery. Other finds included glazed pottery, and tiles, polychrome bangles, coins of Bahmini kings besides those of the Peshwa period.

Houses were on large plinths of semi-dressed stones and walls were of mud.

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| <p>(1) TF-40 Chalcolithic, Period III
Charcoal
Trench 181 B, Section N,
layer 5, depth 1.34.
Field no. 4463
<i>The Proceedings of the Indian Academy of Sciences</i>,
LVIII, 3, Section A, 1963, pp. 141-52
and <i>Radiocarbon</i>, 5, 1963, pp. 273-82.</p> | <p>3110$\pm$110 (3200$\pm$110) B.P.
1250$\pm$110 B.C.</p> |
| <p>(2) P-181 Chalcolithic, Period III
Charcoal
MDI, Trench H, layer 11, depth 22' 8"
(6.9 m.), <i>Radiocarbon</i>, 1, 1959, pp. 43-58.</p> | <p>3106$\pm$122 (3200$\pm$125) B.P.
1250$\pm$15 B.C.</p> |
| <p>(3) P-184 Chalcolithic, Period III
Charred wood from floor sealed by layer 10.
MDI, Trench F, layer 11, depth 22' (6.7 m.).
<i>Radiocarbon</i>, 1, 1959, pp. 43-58.</p> | <p>2542$\pm$115 (2621$\pm$118) B.P.
671$\pm$118 B.C.</p> |
| <p>(4) TF 39 Early Historical, Period IV
Charred grains
Trench 101 B, layer 4
(disturbed by pits)
depth 0.56 m.
Field no. 4132
<i>The Proceedings of the Indian Academy of Sciences</i>,
LVIII, 3, Section A, 1963, pp. 141-52 and
<i>Radiocarbon</i>, 5, 1963, pp. 273-82.</p> | <p>1860$\pm$100 (1910$\pm$100) B.P.
40$\pm$100 A.D.</p> |
| <p>(5) P-183 Late early historical
(Satavahana), Period V
Charred grains
Trench H, soak pit no. 4,
depth 15' (4.57 m.).
<i>Radiocarbon</i>, 1, 1959, pp. 43-58.</p> | <p>1846$\pm$106 (1901$\pm$109) B.P.
49$\pm$109 A.D.</p> |

- (6) TF-38 Late early historical, Period V 1755 $\pm$ 105 (1805 $\pm$ 110) B.P.
145 $\pm$ 110 A.D.
 Charred grains
 Trench 108 B, layer 4, depth 0.15 m.
 Field no. 4197.
The Proceedings of the Indian Academy of Sciences,
 LVIII, 3, Section A, 1963, pp. 141-52 and
Radiocarbon, 5, 1963, pp. 273-82.
- (7) TF-41 Early historical, Period IV 1675 $\pm$ 95 (1720 $\pm$ 100) B.P.
230 $\pm$ 100 A.D.
 Charred grains
 Trench 14 B, layer 2.
 Field no. 4463 A.
The Proceedings of the Indian Academy of Sciences,
 LVIII, 3, Section A, 1963, pp. 141-52 and
Radiocarbon, 5, 1963, pp. 273-82.

Dates of Periods IV and V are not convincing.

L

Site : NOH

District : Bharatpur

State : Rajasthan

The site was mainly excavated by the Department of Archaeology and Museums, Rajasthan. However the Art Department of the University of California collaborated in one season.

Results of several seasons may be summed as follows. Period I representing deposit of about 90 cm. thick brownish clay yielded O.C.P. sherds. Excepting for an incomplete piece of handle no other shape could be made out. However, one sherd bore incised decorations similar to that found at Atranjikhhera.

Period II is marked by the appearance of black-and-red ware, which is plain and does not compare with Ahar. Associated with this are coarse red and black slipped wares. Shapes comprised mainly dish and bowl forms.

Period III is characterized by the presence of painted grey ware showing a rich repertoire of decorations. Black-and-red ware also continued.

Other finds were beads, terracotta discs with scalloped or angular designs at the rim, bone styluses with a socket cover, spear-head, arrow-head with leaf shaped point and socketed tang, axe with broad cutting edge and copper objects. Charred rice was also recovered.

Structural vestiges were not found.

Period IV represents the N.B. P. and its associated ceramic tradition.

Minor antiquities consisted of uninscribed cast coins, terracotta human and animal figurines, stone and terracotta beads, bangles, and rings of copper, arrow-heads of iron, steatite casket etc.

Structural vestiges were of mud and mud-brick walls, drains of baked bricks and ovens. Two floors with hearths were also encountered.

A seal in Brahmi characters reads *Dhuvamitasa*.

Period V is datable to the 2nd century B.C.—Sunga Kushan levels. Pottery was mainly of wheel-thrown red ware. Frequent shapes were bowl, lid cum-bowl and lipped bowl. Stamped *triratna* and *svastika* designs were found on some sherds.

Other finds were terracotta female figurines with elaborate head dress and jewellery, male figurines, animal figurines horse and bull toy cart, flesh rubbers, antimony rods, bangles of glass and terracotta and semi-precious stones, cast copper coins, etc. On a bowl was found an inscription in Brahmi. A bone seal was also found with Brahmi inscription reading *papanutasa*.

Structures were several floors, mud-brick structures, covered drains, hearths, cisterns, etc.

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| <p>(1) UCLA-703B P.G.W. levels, Period III
Charcoal
Trench A, XXII-XXIV,
depth 6' (1.82 m.).
Sample no. E
<i>Radiocarbon</i>, 7, 1967, pp. 336-71</p> | <p>2690$\pm$220 (2771$\pm$227) B.P.
821$\pm$227 B.C.</p> |
| <p>(2) TF-993 P.G.W. levels, Period III
Trench G, layer 20,
depth 6.9 m.</p> | <p>2600$\pm$145 (2675$\pm$150) B.P.
725$\pm$150 B.C.</p> |

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| (3) | TF-994 N.B.P. levels, Period IV
Charcoal
Trench G, layer 14, depth 4.7 m. | 2560 $\pm$ 100 (2635 $\pm$ 105)B.P.
685 $\pm$ 105 |
| (4) | UCLA-703 A P.G.W. levels, Period III
Charcoal
Trench A, XXII-XXIV,
depth 6' (1.82 m.)
Sample no. H.
<i>Radiocarbon</i> , 7, 1967, pp. 336-71. | 2480 $\pm$ 250 (2554 $\pm$ 257) B.P.
504 $\pm$ 257 B.C. |
| (5) | P.G.W. levels, Period III
Charcoal
from a stratified deposit. | 2370 $\pm$ 85 (2440 $\pm$ 90) B.P.
490 $\pm$ 90 B.C. |

LI

Site : PAIYAMPALLI

Lat : 12° 33' N

District : North Arcot

Long : 78° 27' E

State : Tamil Nadu

Excavated by the Archaeological Survey of India.

Two cultural periods with sub-phases in the first were distinguished.

Period I Neolithic : Phase A. Pottery consisted of a pale grey and burnished grey wares besides a red ware in small quantities.

Stone objects included querns, mortars, pestles, pounders and pebble polishers.

Tool repertoire comprised bone-tools represented by awls, points, scrapers, fragmentary ground axes in all stages of manufacture, axe-hammer, maceheads, perforated stones and short blades of chalcedony, chert and quartz. Blades were made locally.

Period I - Phase B : The principal ceramic ware was the red ware although grey ware continued. Painted pottery is conspicuous by its absence. The pottery of pure neolithic levels was either handmade or turned on a slow wheel. Rare shape was the bowl with short channel spout.

This phase is significant for the absence of bone tools and increase in stone blades

Animals known were the bovid group, sheep, deer, fowl, pig, jungle cat and rhino.

The dwelling pits of the neolithic folk were cut into the natural soil and were roughly oval, oblong on plan with their longer axis along the cardinal. A landing or ramp like approach led into these pits. Floors in the earlier phase were of stones while in the latter, of rammed earth. Post-holes along the periphery suggested thatched roof. In the later phase B a definite liking for built up huts with wooden posts for thatching over dwelling pits were noticed. Floors were of stone chips and plastered with ash mixed with earth.

Period II – Megalithic : Pottery consisted mainly of the megalithic wares viz., Black-and-red, red and all black wares besides a coarse, thin red ware painted in chocolate or light brown. Paintings were on the exterior only; the designs being human and plant motifs. Russet coated ware was also available in late levels. Shapes in the Black-and-red ware included bowl, tulip shaped vessel, jar, three legged jar and pyriform jar; in all black ware funnel shaped lid was noticed. In decorating pottery applique and stamping techniques were adopted; the designs being nail and finger tip, palm leaf, wavy line, triangular notches and leaf patterns.

Other finds included sickles, spears, chisels, nails, axes, etc., of iron; bangles of glass, shell and terracotta; beads of glass, crystal, semi precious stones and terracotta; ear ornaments; terracotta birds and animals besides a unique terracotta lamp with eight lips. Another significant object recovered was terracotta conical object of ritualistic significance. Ground axes, however, continued.

Dwellings were usually circular, oval and oblong huts. Floors were of stone chips covered with *muram* and invariably plastered over with lime.

Charred remains of gram (*khulti*) green gram and *ragi*, a sort of millet—are indicative of the food habits of the megalithic folk.

Three megalithic burials—all cairn circles—were also excavated. One contained nothing while the other two were pits lined with stones and contained the usual grave goods and skeletal remains. One cairn entombed a sarcophagus with skeletal remains.

Shapes of pottery were dishes, jars, bowls, tulip vases, funnel shaped lids, ring stands, conical vases, etc.

(1) TF-827 Neolithic, Period I
Charcaol

3570 $\pm$ 105 (3675 $\pm$ 110) B.P.
1725 $\pm$ 110 B.C.

PMP-8, Trench A 1, pit 3 sealed by 6A,
depth 2 m.

Indian Archaeology 1968-69—*A Review*, pp. 71-73

- (2) TF-349 Neolithic, Period I
Charcoal
BNP-1, A1, layer 6, depth 1.8 m.
Field no. BNP/1/A1/64-1.
Current Science, 32, 23, 1966, pp. 585-86 and
Radiocarbon, 8, 1966, pp. 442-52. 3340 $\pm$ 100 (3435 $\pm$ 100) B.P.
1485 $\pm$ 100 B.C.
- (3) TF-833 Neolithic, Period I
PMP-8, Trench XF1, Qdt. 2,
layer 8, depth 1.95 m.
Field no. PMP/8
Indian Archaeology 1969-70—*A Review*, pp. 63-69. 3215 $\pm$ 210 (3310 $\pm$ 210) B.P.
1360 $\pm$ 210 B.C.
- (4) TF-823 Megalithic, Period II
Charred grain and charcoal
PMP-4, B1, Qdt. 2, floor 3 sealed by
layer 4, depth 1.70 m.
Indian Archaeology 1968-69—*A Review*, pp. 71-73. 2515 $\pm$ 100 (2590 $\pm$ 105) B.P.
640 $\pm$ 105 B.C.
- (5) TF-350 Megalithic, Period II
Charred grain
Trench BNP-1, C1 pit 4 sealed by layer 4,
depth 1.30 m. Field no. BNP 1/C1/64-2
Current Science, 35, 23, 1966, pp. 585-86 and
Radiocarbon, 8, 1966, pp. 442-52. 2265 $\pm$ 100 (2330 $\pm$ 105) B.P.
380 $\pm$ 105 B.C.
- (6) TF-828 Neolithic, Period I
Charcoal
Trench PMP-8, A 1, layer 6A,
depth 1.75 m.
Indian Archaeology 1968-69—*A Review*, pp. 71-73. 2100 $\pm$ 95 (2160 $\pm$ 100) B.P.
210 $\pm$ 100 B.C.
- (7) TF-829 Neolithic, Period I
Charcoal
Trench PMP-8, A 2, pit 9
sealed by layer 7, depth 1.30 m.
Indian Archaeology 1968-89—*A Review*, pp. 71-73. 985 $\pm$ 105 (1015 $\pm$ 105) B.P.
935 $\pm$ 105 A.D.
- (8) TF-824 Megalithic (?), Period II
Charcoal
Trench PMP-8, A 2, pit 6
sealed by layer 4, depth 1.20 m.
Indian Archaeology 1968-69—*A Review*, pp. 71-73. 785 $\pm$ 90 (810 $\pm$ 95) B.P.
1140 $\pm$ 95 A.D.

- (9) TF-825 Megalithic (?), Period II
 Charcoal
 Trench PMP-8, A 2, pit 1,
 sealed by layer 5, depth 0.87 m.
Indian Archaeology 1968-69-A Review, pp. 71-73.
- 695 $\pm$ 95 (715 $\pm$ 100) B.P.
 1235 $\pm$ 100 A.D.

Dates of TF nos. 828, 829 and 832 pertaining to the neolithic period and TF nos. 824 and 825 relating to the megalithic culture are to be discounted; they are internally inconsistent.

LII

Site : PALVOY

Lat : 14° 31' N

District : Anantapur

Long : 77° 09' E

State : Andhra Pradesh

Excavated by the Deccan College Postgraduate and Research Institute, Pune.

Four trenches in the two ashmounds – two in each – and two more in the habitation area were laid.

In ashmound I (Trench I & II) fourteen layers were encountered. Three periods were distinguished, *viz.*, pre-neolithic, neolithic and post-neolithic iron age.

Period I pre-neolithic is represented by layer 14; layer 12 and 13 were barren. Layer 14 yielded patinated trap of flakes and microliths.

Period II neolithic is denoted by layers 9 to 11. Ceramic contents were painted pottery and blotchy grey ware. All pottery was handmade.

Other objects were neolithic stone implements, and edge ground bone axe found for the first time. Besides, curious unbaked clay objects, charcoal and animal bones were found.

Two floors with post-holes were met with.

Period III post neolithic Iron Age is represented by layers 1 to 8.

Fragmentary potsherds, fragmentary bones with charcoal and iron slag, deliberately formed dome-shaped columnar structures with glassy porous green flowers inside the cavities and charred identifiable bones were found.

Floors with post-holes indicate house-plans.

In the other ashmound only neolithic levels were encountered. Finds were ground bone axes some of which were of unusual dimensions.

In the habitational terraces the purpose of digging was to connect them with the ashmound. In trench H1 four single urn burials below 10 cm. were found. No other vestiges were encountered. In trench H 2 ground stone axes, rubbing stones, sling balls, hammerstones and pottery were found.

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| (1) | TF-701 Neolithic, Period II
Charcoal
depth 3.5 m.
<i>Indian Archaeology</i> 1967-68— <i>A Review</i> , pp. 69-72.
and <i>Radiocarbon</i> , 11, 2, 1969, pp. 502-508. | 3805 $\pm$ 100 (3915 $\pm$ 105) B.P.
1965 $\pm$ 105 B.C. |
| (2) | TF-700 Neolithic, Period II
Carbonaceous ash (dung)
layer 7, depth 2.1 m.
Sample no 2.
<i>Indian Archaeology</i> 1969-70— <i>A Review</i> , pp. 63-69. | 3388 $\pm$ 97 (3490 $\pm$ 100) B.P.
1540 $\pm$ 100 B.C. |

LIII

Site : PANDU-RAJAR-DHIBI

Lat : 23° 34' N

District : Burdwan

Long : 87° 39' E

State : West Bengal

Excavated by the Department of Archaeology, Government of West Bengal.

Site is located on the southern bank of the Ajay. Four trenches RDB I to IV were laid.

Excavations revealed four cultural periods of which the first three were proto-historic.

Period I : Ceramic contents comprised of ill-fired handmade pale red, grey or black and black-and-red wares. The fabric was thick with paddy husks in the core. A wheel-turned ware of thin section, pale red in colour and of sandy fabric was also observed.

A solitary bone point was the only find worth mentioning.

Huts with floors of pellety laterite, occasionally burnt hard, were the structural remains.

Judging from silty deposit it can be surmised that the habitation came to end due to floods.

Burials were fractional inhumation with the longer axis along east-west.

Period II : Ceramic contents were black-and-red ware, both plain and painted, bright red ware, chocolate ware, chocolate or buffish ware painted in creamish white and black burnished ware. Shapes were lipped bowl, channel spouted bowls, pedestalled cup, knobbed lid, shallow bowls, sometimes with stems, etc. Painted designs consisted of horizontal bands, solid triangles, chevrons, criss-crosses, wavy lines, sometimes bounded by parallel lines, star or a stylised starfish, etc. Pottery of the earlier period, however, continued.

Other antiquities consisted of microliths, flakes, cores, scrapers, etc.; polished stone axes; bone points and bone arrow-heads; beads; stone discs with stylised creeper motif; terracotta seal with star; and rings, bangles, nails parers etc., of copper.

Structural remains were pier-like construction paved with terracotta nodules, lime washed and with a ramp or staircase at the north-east corner and post-holes. Floors were of pellety laterite.

Extended fractional and urn-burials were the three types of disposal of the dead pertaining to this period.

Period III : Ceramic contents were bright red ware painted in black or whitish cream, black-and-red ware painted in white and occasionally in cream, perforated ware and incised pottery in black burnished ware, NBP sherds, etc.

Among the shapes channel spouted vessels may be mentioned.

Painted designs were rows of uprights, dots; oblique lines, simple bands, lattices, wavy lines, stepped chevrons, etc.

Incised decoration comprised wavy lines and a pea-hen or crane motif holding a serpent by tail.

Other finds of the period consisted of microliths, polished stone axes, copper points, ring bangles, leaf-shaped arrow/spear-heads; beads of semi-precious stones; iron arrow-head; terracotta figurines (mother goddess) with pin-hole decoration; exotic human figurines with exaggerated chin and pointed cape, human figurines with pinched head and flesh rubbers of terracotta; ivory combs; tanged arrow-heads, picks and points of bone; pellets and broken pin of gold and several clay seals with double axe motif.

Double row of ovens at right angles to each other and another set of six elliptical ovens flanked by thick deposit of ash containing iron slag and pottery—possibly used as smelting ovens—were also found.

Charred rice was also discovered.

Period IV : This period followed after a break.

Shapes in pottery consisted of plain storage jar, saucepans with handle, lids with central knob, conical bowls, etc.

Other finds were some polished stone celts, bone tools, beads and a copper eye-pencil.

TF-61 Period IV (?)

Charcoal

Trench RDB IV, O-II, layer 2 C, depth 1 m.

Current Science, 33, 2, 1964, pp. 40-42 and

Radiocarbon, 6, 1964, pp. 226-32.

1230 ± 105 (1260 ± 110) B.P.
690 ± 110 A.D.

LIV

Site : PATALIPUTRA

Lat : 25° 37' N

District : Patna

Long : 85° 15' E

State : Bihar

Excavated by the K.P. Jayaswal Research Institute, Patna.

Trenches were laid in many localities of the Patna city and the collective cultural milieu is divisible into three periods.

Period I is marked by the occurrence of the NBP, black-and-red, grey black and red wares. The NBP ware was of fine to medium fabric and was available in steel blue, (most common) silver and golden colours. Main shapes were dish and bowl. The black-and-red ware was of coarse fabric; representative types were basins and big jars. The other wares were of fine grained clay. Pot-forms were dish, bowl, lipped bowl, bowl with corrugated sides, lid-cum-bowl, carinated *handi*, etc. Design repertoire mainly impressed, comprised hollow cross, crescent on hill, spoked-wheel, concentric circle with/without pellets, graffiti of human figures, etc. All the wares were wheel-thrown.

Other objects were terracotta human and animal figures, both hand modelled and moulded, bone styli, arrow-heads, etc; terracotta ear-ornaments; carved stone pieces coins, etc.

Structural remains were brick flooring, and terracotta ring-wells.

A huge conflagration was observed, at a level representing the first half of the 2nd century B.C.

Period II saw the disappearance of the ceramics of the previous period. However, the red ware alone survived and exhibited either a red wash or slip. Pottery was wheel turned and mainly plain and utilitarian with its fabric varying from medium to coarse. Characteristic shapes were miniature vase, basin, and conical bowl.

Terracotta figurines, both hand modelled and moulded, the former crude while the latter better finished were, found. Worth mentioning are the two heads with typical Kushan headdress and the naigamesa figurines. Other objects included terracotta ear ornaments, flesh rubbers, pendants of various shapes, uninscribed cast coins, Kausambi 'lanky bull' type coins; arrow-heads, awls, styli of bone; a gold amulet fashioned after a coin of Huvishka with the effigy of the king and legend on the obverse; antimony rods, spoon and bell of copper.

Structures were of burnt brick. Eight phases were noticed. Besides terracotta ring-wells were also found.

The last period of occupation commences after a lapse of 1200 years by about 700 A.D. and after. Glazed wares and plain red wares denote the ceramic industry. Plates, water vessels and *handis* were the forms. Associated objects were moulded terracotta figurines with Maratha and Muslim head gears, glass beads and iron objects mainly axes and sickles.

Houses were of brick bats, probably retrieved from earlier structures.

Archaeologically the periods I to III are dated to c. 600-150 B.C., 150 B.C. to 700 A.D. and 700 A.D. 1700 and after, respectively.

TF-169 Mauryan (?) Period I

Wood

2005 $\pm$ 95 (2065 $\pm$ 100) B. P.

115 $\pm$ 100 B. C.

From the palisades at Kumrahar,
depth 5.4 m.

Current Science, 34, 13, 1965, pp. 394-97 and

Radiocarbon, 8, 1966, pp. 442-52

The date varies from archaeological estimate.

LV

Site : RAJBADI-DANGA (Jadupur)

Lat : 24° 01' N

District : Murshidabad

Long : 88° 11'E

State : West Bengal

Site was excavated by the Calcutta University, Calcutta.

Six structural phases were observed.—Phase I was right on the natural soil. Phase II over the silty soil was represented by walls. To phase III belonged the granary, the *Panchayatana* temple-complex built over the debris of the earlier period. To the next two phases — Phases IV and V — can be assigned the oblong temple-complex with *ardhachandra* entrance platform; walls, brick platforms with *surkhi*, rammed and lime plastered. To the last phase — Phase VI also belonged some walls, floors and brick platforms.

Ceramic contents of the site could be grouped into three, lower, middle and upper. In the lower levels were found ordinary dull red ware with thick section; red orange brown, chocolate brown, polished sherds; multicoloured sherds with thick section.

Painted sherds, though few, came from the middle and upper levels. The design repertoire consisted of simple vertical or horizontal lines, geometrical patterns, fish scale and floral designs.

Sprinkler was found in all levels.

The entire pottery excepting a few sherds was wheel-turned.

Other finds included human and animal figurines, balls, gamesman, moulded tiles, flesh rubbers, dabbers, beads, etc., of terracotta; stucco heads and stone, shell, glass, copper/bronze and iron objects.

Seals and sealings from this site are quite a few. They usually consist of *dharmachakra* flanked by two deer and the Buddhist formula. However, special mention

may be made of one referring to *Raktamrittika-vihara* and its *Acharya bikshu, Deve*. Palaeographically these are datable to c. 9–10 century A.D.

Chronology of the phases as derived from associated finds and C determination is as below.

Phase I–II	— 2nd to 5th century A.D.
Phase III	— 6th to 7th century A.D.
Phase IV to VI	— 8th to 13th century A.D.

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| (1) | TF-636 Historical
Charcoal
Trench B5, layer 8, depth 3.3 m.
<i>Current Science</i> , 38, 11, 1969, pp. 259–60,
<i>Radiocarbon</i> , 11, 2, 1969 and
<i>Indian Archaeology</i> 1967–68—A Review, pp. 69–72. | 1665 $\pm$ 95 (1710 $\pm$ 95) B.P.
240 $\pm$ 95 A.D. |
| (2) | TF 634 Historical
Charcoal
Trench B5, layer 8, depth 3.1 m.
Field no. 9.
<i>Current Science</i> , 38, 11, 1969, pp. 259–60
<i>Radiocarbon</i> , 11, 1, 1969, pp. 188–93 and
<i>Indian Archaeology</i> 1967–68—A Review, pp. 69–72. | 1520 $\pm$ 90 (1565 $\pm$ 95) B.P.
385 $\pm$ 95 A.D. |
| (3) | TF-629 Historical
Charcoal
Trench B3, layer 12 A,
depth 3.5 m.
Field no. 3.
<i>Current Science</i> , 38, 11, 1969, pp. 259–60,
<i>Radiocarbon</i> , 11, 1, 1969, pp. 188–93 and
<i>Indian Archaeology</i> 1967–68—A Review, pp. 69–72. | 1495 $\pm$ 90 (1540 $\pm$ 95) B.P.
410 $\pm$ 95 A.D. |

LVI

Site : RAJGHAT

Lat : 25° 18' N

District : Varanasi

Long : 83° 1' E

State : Uttar Pradesh

Excavated by the Banaras Hindu University, Varanasi, for more than a decade.

The occupation here extended from the first quarter of the first millennium B.C. to the 17th century A.D.

The cultural deposit is divisible into six periods with three sub-periods in the first.

An important discovery is the clay embankment on the river front with two structural phases with a pronounced slope towards the river. The earlier phase is of rammed compact brownish clay with an extant height of 5.10 m. and a basal width of 19.80 m. In the second phase the height was increased by 1.10 m. and was achieved by mud filling. A drain, silted and disused, belonged to this phase. The embankment at its tail end on the river front had a timber platform. There was a gap of 25 cm. between the platform and the embankment consisting of ash, charcoal and potsherds. A wooden platform (thickness of wood 3 to 5 cm.) was found to a length of 34 m. Due to heavy floods this platform went into disuse when the embankment came up.

The cultural milieu of the several periods are as under:

Period I A (800–600 B.C.) is characterized by black slipped, coarse black and red, ochrous red and grey wares. The grey ware is of fine fabric and is comparable to the PGW fabric. However, these are not painted. In this level the black slipped ware appears to be the earliest. The incidence of black-and-red ware in the lower layers is high and get diminished gradually. Some of the black-and-red ware sherds bore paintings in white pigment.

The embankment was constructed in this phase.

Period I B (600–400 B.C.) : Iron appeared in this level. This is distinguished by the appearance of the NBP Ware in steel blue and silvery to golden hues. Shapes represented were bowl with straight and corrugated sides, shallow dish and carinated *handis*. Some of the NBP sherds exhibited paintings. Incised sherds and those with graffiti were also present. Other wares of the previous sub-periods however continued indicating a continuity in tradition.

Other finds included beads, terracotta animal figurines, discs, and some iron objects.

Structural vestiges were a floor of burnt clay with two post-holes and three pits, two with terracotta rings.

Period I C (400–200 B.C.) : Witnessed a deterioration in the quality of ceramics. Pottery was of coarse fabric. NBP ware was of poor finish of grey and black wares. This period also witnessed decline and disappearance of the NBP ware. New shapes in red ware were discerned. A gradual decline in the grey ware was also seen.

Other finds included a number of cast copper coins, terracotta balls, etc.

Structural vestiges were mud walls and terracotta ring-wells.

Period II (200 B.C. – beginning of Christian era) : In this period there is a spurt in structural activities, which fall under two phases. This period also witnessed the complete disappearance of the black-and-red ware as also the entire ceramic assemblage of Period I. Instead, a red ware becomes the dominant industry. Shapes in this included bowl forms, lipped basin, inkpot lid, etc. Stamped pots, spouted vessels also appear. Other finds were inscribed terracotta sealings, moulded terracotta figurines, iron arrow-heads, bone points in large numbers (more than a thousand), charred grain, etc.

Pertaining to the early phase of structural activity was a house with two rooms, a vestibule, a bath and a well. In the subsequent phase the well was raised by the addition of a terracotta ring and a seven course of brickwork. Floors were on a soling of brickbats, occasionally with potsherds, small stone rubble well rammed and overlaid by a covering of clay. Foundations were of brick concrete with *kankar* soling. Terracotta ring-wells were also observed.

Period III (beginning of Christian era – 3rd century A.D.) : Cultural milieu of this level is marked by the occurrence of a number of terracotta seals and sealings; the common name occurring being Harisena. Besides terracotta figurines, both human and animal, discs, flesh rubbers, balls, copper antimony rods, stone balls, shell bangles, terracotta potter's stamp, beads of terracotta, carnelian, agate, jasper, etc., ivory gamesmen were also recovered. Worth mentioning is a bead depicting a crow.

Structures were of baked bricks. A brick platform was also exposed.

Ceramic tradition, however, did not vary from the earlier period.

Period IV (300 A.D. – 700 A.D.) : The predominant pottery was a red ware. Spouted vessels and sprinklers are noteworthy. Sealings reading *Pakhikula*

and *Govindaswami* were discovered. Minor antiquities consisted of moulded terracotta figurines, terracotta gamesmen, stone and copper objects, beads and pendants of glass, agate, jasper, and carnelian. A boat shaped bead of carnelian from this level is interesting. Four Gupta coins and other objects were also found in a pot. The coins were of Chandragupta, Kumaragupta and Skandagupta.

A brick edged platform associable with an apsidal structure was exposed.

Period V (700–1200 A.D.) : Strata of this period is very much disturbed due to large and deep pits. Fragments of architectural members, pedestal with a linga and sculptures were found. An agate bead with its corners covered with embossed gold sockets and a copper wire through its hole is an interesting find.

The last period – Period VI – assignable to 1200 – 1700 A.D. is represented by the find of glazed ware with a variety of floral designs. Structural vestiges were lime-floors.

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| (1) | TF-293 N.B.P. levels early phase, Period I B
Charcoal
Trench RGT – XI, XI–XII, layer 11,
depth 9.45 m.
Field no. RGT XIA/1963–64, S.no.2.
<i>Current Science</i> , 35, 1, 1966 pp. 4–5 and
<i>Radiocarbon</i> , 8, 1966, pp. 442–52. | 2370 $\pm$ 105 (2440 $\pm$ 110) B.P.

490 $\pm$ 110 B.C. |
| (2) | TF-292 Black slipped ware deposits – Period I A
Charcoal
Trench RGT, cutting B, O–II,
layer 6, depth 5.9 m.
Field no. RGT, Cutting B/1963–64, S.no. 5
<i>Current Science</i> , 35, 1, 1966. pp. 4–5 and
<i>Radiocarbon</i> , 8, 1966, pp. 442–52. | 2350 $\pm$ 95 (2420 $\pm$ 100) B.P.

470 $\pm$ 110 B.C. |
| (3) | TF-294 Black-and-red ware deposits
Charcoal
Mound I, Trench RGT, XIA, X–XI,
layer 14, depth 11 m.
Field no. RGT XI A, 1963–64/5 no. 4
<i>Current Science</i> , 34, 13, 1965. pp. 394–97 and
<i>Radiocarbon</i> , 8, 1966, pp. 442–52. | 2190 $\pm$ 85 (2255 $\pm$ 90) B.P.

305 $\pm$ 90 B.C. |

LVII

Site : RAJGIR

Lat : 25° N

District : Patna

Long : 85° 25' E

Excavation was conducted by the mid-eastern circle of the Archaeological Survey of India.

Two cuttings, one across the southern defence and one in the habitation area were made. Excavations revealed a 18 feet (5.48 m.) thick deposit divisible into three periods with sub-divisions in the last two.

Period I: represented the pre-defence occupation. Ceramic contents were the NBP, a red ware of medium to fine fabric with paintings in black pigment and in linear designs.

Other finds included terracotta human figurines, copper objects, steatite amulets and a hoard of fourteen punch-marked coins.

Structures were on stone foundations and the period came to an end due to conflagration.

Period II A : The use of iron is testified in this period. In this period over the burnt material of the previous period was constructed a mud rampart with a battered brick retaining wall on the south.

Ceramics of the earlier period continued.

Period II B : In this period brick walls were added to the extant mud rampart.

A hoard of bone styluses and arrow-heads were found in a soakage pit in a room.

Period III A : Some repairs were carried out to the rampart. The ceramics of the II A continued. Besides glass beads, inferior pottery and iron objects were found.

Period III B : During the period, over the repaired fortification, a wide wall, essentially of brickbats came into existence. The stone fortification also belongs to this period.

TF-45 Early Historical Period I Charcoal	2150 $\pm$ 100 (2215 $\pm$ 105) B.P.
Part of burnt building material in layer 4, below the mud rampart. Locus. VII-IX, depth 7.05 m. <i>The Proceedings of the Indian Academy of Sciences</i> , LVII, 3 Section A, 1963, pp. 141-52 and <i>Radiocarbon</i> , 5, 1963, pp. 273-82.	265 $\pm$ 105 B.C.
TF-46 Early Historical Period I Charcoal	2150 $\pm$ 100 (2210 $\pm$ 100) B.P.
Part of burnt building material in pit 3, cut into layer 5; contents of pit being ashy materials of layer 4, under Rampart; depth 8.7 m. <i>The Proceedings of the Indian Academy of Sciences</i> , LVIII, 3, Section A, 1963, pp. 141-52 and <i>Radiocarbon</i> , 5, 1963, pp. 273-82.	260 $\pm$ 100 B.C.

LVIII

Site : RANG MAHAL

Lat : 29° 21' N

District : Bikaner

Long : 73° 57' E

State : Rajasthan

Excavated by the Swedish Archaeological Expedition to India 1952-54.

The site is a unicultural one.

Three periods of settlement and eight structural phases in the last period of settlement were observed.

The first period of settlement was on the colian sand. A number of small pieces of potsherds comparable to the common Rang Mahal red ware were found. In the second period of settlement sherds of common red ware were available. Besides shells of *Pila globosa* were also found. During these two settlement-periods climate was dry.

The eight structural phases of settlement period III are as below:

Phase I: Earliest vestiges of residences and portions of houses were revealed. Constructions were of sun-dried bricks, size of which varied from 32-36 cm. $\times$ 22-25 cm.

×6–8 cm. However, common size was 32 x 23 x 7 cms. The walls were not bonded. Bricks were made of brown clay.

Phase 2: In this phase slightly larger size of sun-dried bricks came to be used. A pit in this level contained potsherds with soot marks and bands of ash.

Phase 3: Walls of this phase were constructed of well-made sun-dried bricks. Further a floor of burnt bricks was also exposed. A pit contained large quantities of pottery (coarse bowls, jars,) ash and charcoal. Pottery was basically coarse household vessels.

Phase 4: Vestiges of several walls of sun-dried bricks pertain to this level. A niche of burnt bricks was also exposed. Pottery was coarse. Painted variety was rather scarce. Two glazed sherds were also found.

Phase 5: New constructions with sun-dried brick pavings were noticed.

Phase 6 is represented by foundations of houses.

Phase 7: In this phase also structures were of sun-dried bricks.

Phase 8: Structures were in a highly disturbed state.

Ceramics at this site was of a complete homogeneous nature throughout. The Rang Mahal pottery was reddish or pinkish in colour. It was seldom yellowish. Pottery was wheel-made. In case of moulded shapes, first they were thrown on a wheel and subsequently pressed into a mould. The inner surface was then smoothened. The wares were well-fired. Painted wares were of fine clay. However, it may be noted that the decorated and moulded pottery show an increase in frequency in the upper levels. Fine pots are less in frequency in the lower levels.

Shapes consist of globular jars and its variants, carinated vessel, flask shaped jar, spouted jar, sprinkler of Red Polished Ware, stove like vessels, triangular flask, cooking vessel, pan and trough with loop handles, storage jar, tripod vessel, jug with handle, beakers, bowls, dish, small plate, basin, lid, stand, lamp incense burner, perforated vessel, etc.

Decorations on pottery consisted of applied, incised patterns and painted motifs. Applied decorations comprised horizontal wavy bands of ribbing, zones of wavy ribbings, finger tip and thumb impressions and rippled bands.

Painted patterns were mainly black on red or pinkish slip and rarely on purple slip. Design repertoire was parallel lines, floral or animal motifs, wavy lines below a zone of parallel lines, bands of zig zag lines within a zone of parallel lines, thick

parallel lines, plants and flowers, creepers separated by vertical geometrical designs, conventional leaf patterns, birds, snakes, etc.

Other objects obtained in the excavation were human figurines in faience and porcelain, terracotta animal figurines, cart and wheels, weights, balls, flesh rubbers, discs, large flat handled objects, dice, votive tanks, potter's stamp, pendants, ear ornaments, beads, beads covered with bronze, etc., of terracotta, beads of semi-precious stones, coral, paste and lapis lazuli and shell, bangles of glass, mortars, rotary querns, mullers, pestle and whetstone of stone, bone objects, handles of bell, bracelet, ring, clasp, etc., of bronze and ladle, handles of vessels, socketed rings, sickles, arrow-head, spear-head, bowl, bell, hook, etc., of iron. More than one hundred copper coins were found; representative of which are those of Murundas, Kanishka I and III, Huvishka and Vasudeva. Besides, inscribed clay tablets, terracotta sealings and bronze seals were also found.

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| (1) | U-1
Charcoal
Trench RMI, A 12, depth 3.6 m.
<i>Radiocarbon</i> , 3, 1, 1959, pp. 87-102. | 1810 $\pm$ 120 (1864 $\pm$ 123) B.P.
86 $\pm$ 120 A.D. |
| (2) | U-23
Camel bones - inorganic portions,
Trench RM II, 15.00
depth 2 m.
<i>Radiocarbon</i> , 1, 1959, pp. 87-102 | 1570 $\pm$ 150 (1617 $\pm$ 155) B.P.
333 $\pm$ 155 A.D. |
| (3) | U-52
Charcoal
Trench R II-4, depth 0.5 m.
<i>Radiocarbon</i> , 1, 1959, pp. 87-102. | 1480 $\pm$ 70 (1524 $\pm$ 72) B.P.
426 $\pm$ 72 A.D. |
| (4) | U-24
Camel bones—inorganic portion.
Trench RM II-15.00, depth 2 m.
<i>Radiocarbon</i> , 1, 1959, pp. 87-102. | 760 $\pm$ 100 (782 $\pm$ 103) B.P.
1068 $\pm$ 103 A.D. |

Dates are not convincing.

LIX

Site : ROJDI

Lat : 21° 51' N

District : Rajkot

Long : 70° 54' E

State : Gujarat

Excavated by Shri P.P. Pandya.

The occupational debris is divisible into two periods.

Period I, Harappan habitation which is again divisible into three phases, A, B and C.

Period I, phase A : The pottery shapes comprised convex-sided, carinated and handled bowl, perforated jar, vase, dish-on-stand, trough, etc. The pottery was fashioned out of well-levigated clay, well-fired and slipped which was usually red but rarely chocolate as well. Mostly the pottery was plain but painting when present was bands in black pigment. A crude, ill-fired and sometimes grey slipped ware with incised decorations was also present.

Other finds included blades, trapezes, and lunates of chert; pipes, rings and celts of copper; spiral gold rings, copper bangles, etched carnelian beads and beads of faience and terracotta.

Houses of this phase were built on a mud platform which was capped by rammed earth and lime. Structures were of mud and mud-bricks.

Phase A came to an end through destruction by fire.

The ceramics of Phase B consisted of red and buff wares. A few sherds of green ware were also present. Shapes were convex-sided bowl, perforated jar, dish and dish-on-stand. Paintings in black pigment over red, buff or chocolate slip comprised fish, leaves, hatched triangles, lozenges, intersecting loops, roundels, wavy lines, vertical bands, etc.

Of the two black and red ware sherds recovered, one was painted in white, the design being concentric circles. Corrugated grey ware was found in greater frequency.

Other antiquities were blades and other microlithic tools; chisels, rods and bangles of copper; beads of faience, banded agate and etched carnelian, gold ornaments, chert weights and gamesmen.

Houses were rubble and mud structures plastered with lime. Floors were of rammed earth.

The next phase, phase C, was characterized by the Late Harappan wares. Perforated jar and square rimmed jar were absent. Besides, pottery of Prabhas II were

also available. Painted designs comprised horizontal, slanting bands, wavy lines and intersecting loops. Beads of carnelian terracotta and shell were found.

Houses were built of rubble.

Period II commences after a long desertion. This period represents the early historical levels and is distinguished by the occurrence of the Red Polished Ware, and coarse grey ware. Black pottery is also present.

Alignment of structures is quite different from Period I.

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| <p>(1) TF-200 Harappan Period I, Sub-phase B
Charcoal
Mound I, Trench B/5, VII-IX,
layer 3, depth 0.65 m.
Mound I, Trench B
<i>Current Science</i>, 33, 9, 1964, pp. 266-69 and
<i>Radiocarbon</i>, 7, 1967, pp. 291-95.</p> | <p>3810$\pm$110 (3920$\pm$125) B.P.
1970$\pm$125 B.C.</p> |
| <p>(2) TF-199 Harappan Period I, Sub-phase 3
Charcoal
Mound III, Trench C, pit 2
sealed by layer 4, depth 1.75 cm.
Mound III, Trench C/4
<i>Current Science</i>, 33, 9, 1964, pp. 266-69 and
<i>Radiocarbon</i>, 7, 1967, pp. 291-95.</p> | <p>3590$\pm$100 (3695$\pm$105) B.P.
1745$\pm$105 B.C.</p> |

LX

Site : ROPAR

Lat : 30° 58' N

District : Ropar

Long : 76° 32' E

State : Punjab

Site was excavated by the Archaeological Survey of India.

The habitation deposits were divisible into five periods. Earliest inhabitants were the Harappans.

The cultural *milieu* of the successive periods are as follows :

Period I Harappan : Characteristic ceramics of the Harappans, beads and bronze celts, chert blades, faience ornaments, terracotta cakes and inscribed steatite seals were found.

Pottery forms were dish-on-stand, beaker, vase, dish, basin and perforated jars.

Four structural phases were observed. Houses were of mud-bricks.

After Period I there was a gap.

Period II was represented by the emergence of the Painted Grey Ware. Pottery forms were similar to those from comparable levels at Hastinapur. Limited excavations in this strata were without any structural vestiges. Other finds were beads of semi-precious stones, glass and bone and bangles of glass. The date assigned to this period is 1000 B.C.

A hiatus separates this and the succeeding period.

Period III is assigned a date beginning from the middle of the first millennium B.C. to 2nd century B.C. This period is distinguished by the appearance of the NBP Ware and a plain red ware. Punch marked copper coins, inscribed seals, typical terracottas, Mauryan stone objects, a stone disc carved with a figure of fertility goddess, comb, pin, collyrium rod, carved handle of styli of ivory, toy-cart, animals, etc., of terracotta, were the associated finds. A Smith's shop with traces of bead manufacture was also discovered. Use of iron is attested in this level. Houses were of cut *kankar* stones. A brick-built tank with an inlet was a notable structure. Soakage wells served sanitary purposes.

A unique find is a small ivory seal with the legend *Bhadapalasa* in Mauryan/ Brahmi characters.

Period IV (from 2nd Cen. B.C. to 6th Cen. A.D.) : NBP Ware continued in this level also. This period is divided into two sub-periods on the basis of coins, seals and terracottas. Coins of the Indo-Greek kings viz., Antialkidas, Soter Megas, and a mould from a coin of Appollodotus II, gold coins of Chandragupta I, Taxila, Audumbara and Mathura coins, besides a hoard of six hundred coins, mainly of the Kushanas were found.

Other objects were a bronze *Yajnika Brahmana* figure, stone plaques of the Gupta period, 3 silver utensils-one showing Greek influence, a bronze disc with perforated bosses at the back showing winged griffin, clay sealing, iron slag, etc. In pottery also Greek influence is seen.

Period V is distinguished by the occurrence of coins of Huna king Mihirakula and well-made brick houses. This is datable to 8th–10th century A.D.

Pottery consisted of glazed and polychrome wares. Muslim coins were also found.

Structures were encountered in all periods excepting the first. Almost from the beginning of habitation at the site, river pebbles, roughly hewn *kankar*, mud and baked bricks were the building materials.

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| <p>(1) TF-209 Early historical, Period III
Charred wood
Trench RPR-2, X'-XI',
layer 30, depth 11.4 m.
Field no. RPR-2/3094
<i>Current Science</i>, 34, 13, 1965, pp. 394-97 and
<i>Radiocarbon</i>, 9, 1966, pp. 442-52.</p> | <p>2365 ± 100 (2435 ± 100) B.P.
485 ± 100 B.C.</p> |
| <p>(2) TF-213 Early Historical, Period III
Trench RPR-1, O-VIII, layer 26,
Field no. RPR-1/1710.
<i>Current Science</i>, 35, 1, 1966, pp. 4-5 and
<i>Radiocarbon</i>, 8, 1966, pp. 442-52.</p> | <p>2275 ± 100 (2340 ± 105) B.P.
390 ± 105 B.C.</p> |

LXI

Site : SANGANKALLU

Lat : 15° 11' N

District : Bellary

Long : 76° 58' E

State : Mysore

Excavated by the Deccan College Post Graduate and Research Institute, Pune, and the Karnataka University, Dharwar.

The purpose of this second probe was to determine the exact position of the patinated flakes of traps and microliths of quartz.

Four periods were distinguished in the several trenches laid.

Period I : Assignable to Stone Age consisted of choppers, chopping tools, scrapers, prepared flakes; all highly patinated and on trap dyke.

Period II is characterised by microliths. Types included cores, lunates, scrapers and quartz flakes.

Period III : Neolithic with two phases. This is characterised by the ground stone tools, pottery and circular huts.

Period IV is megalithic with typical *milieu* of the Deccan megalithic culture.

Period III and IV were discerned in the Mocha Road trench.

The excavation proved that there was no gap between microlithic and stone axe cultures as suggested earlier. The microlithic industry succeeded the industry in trap.

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| (1) | TF 354 Neolithic, Period III
Charcoal
Trench 1-2, layer 3, depth 2.5 m.
Field no. SKI./Tr-1-2/64-65/393.
<i>Current Science</i> , 35, 23, 1966, pp. 585-86 and
<i>Radiocarbon</i> , 10, 1968, pp. 131-43. | 3440 ± 100 (3540 ± 110) B.P.
1590 ± 110 B.C. |
| (2) | TF 355 Neolithic, Period III
Charcoal
S. R. Rao's Trench II, layer 2,
depth 1.40 m.
Field no. SKI./S. Rao's II/64-65/474
Eastern section.
<i>Current Science</i> , 35, 23, 1966, pp. 585-86 and
<i>Radiocarbon</i> , 10, 1968, pp. 131-43. | 3435 ± 100 (3535 ± 105) B.P.
1585 ± 105 B.C. |
| (3) | TF 359 Neolithic, Period III
Charcoal
Trench 1-2, layer 4, depth 2.5 m.
Field no. SKI./Tr. 1-2/64-65/568
<i>Current Science</i> , 35, 23, 1966, pp. 585-86 and
<i>Radiocarbon</i> , 10, 1968, pp. 131-43. | 3400 ± 100 (3500 ± 105) B.P.
1550 ± 105 B.C. |

LXII

Site : SARADKEL

Lat : 23° 03' N

District : Ranchi

Long : 85° 21' E

State : Bihar

Excavated by the Archaeological Survey of India.

An Asura site on the left bank of the Tanaja with two occupational periods essentially of the same culture. The mound rises to a height of 9 m.

Period I : This period revealed no building remains. However, presence of brickbats would suggest building activity. A number of pits discovered were perhaps meant for iron smelting.

Period II : Ceramic contents were a terracotta red ware coarse in fabric and thick section, grey and black-and-red wares. Main shapes were jars, bowls, vases, ledged lids and sprinkler with incised designs; the last suggesting Kushana influence.

Other antiquities comprised arrow-heads, knives, double-single-headed axes, chisels, nails, ploughshares, caltrops, door hinges, rings, etc., of iron; terracotta human and animal figurines; beads of semi-precious stones and two legged querns.

This period is noted for the spurt in building activities. A massive brick wall along the Tanaja was perhaps intended to keep the site safe from floods. The houses were oriented along the cardinal directions. The floors were made up of brick and brickbats set in clay and solidly rammed.

The culture is entirely an iron using one without stone or copper assemblage at any stage.

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- (1) TF-369 Asura-culture
Charcoal
Trench SDK-2, C3-C4, layer 4,
depth 0.01 m.
Field no. SDK-2/65/114
Current Science, 35, 11, 1966, pp. 276-78 and
Radiocarbon, 8, 1966, pp. 442-52.

1910±90 (1970±90) B.P.
20±90 B.C.

- (2) TF 370 Asura Culture
Charcoal
Trench SDK 2; A1 A2, layer 3,
depth 0.07 m.
Field no. SDK 2/65/248
Current Science, 38, 11, 1969, pp. 259-60 and
Radiocarbon, 10, 1968, pp. 131-43.

1795 $\pm$ 100 (1850 $\pm$ 100) B.P.
100 $\pm$ 100 A.D.

LXIII

Site : SARAI NAHAR RAI

Lat : 25° 45' N

District : Pratapgarh

Long : 81° 50' E

State : Uttar Pradesh

Excavated by the Department of Archaeology, Government of Uttar Pradesh.

An extended burial in supine position was exposed. Orientation of the skeleton was east-west. Head was on the west. Along with the skeletal remains were found two fragmentary cores, charred animal bones and two lumps of burnt clay.

From surface indications eight more burials were discovered.

Earlier exploration of the site yielded Late Stone Age tools, viz., blades, triangles, lunate points, scrapers, and arrow-heads, etc.

TF 1104 Late Stone Age
Human bones
Trench C 5, Qdt., 3, layer 1,
depth 0.5 m.
Indian Archaeology 1970-71-A Review
(cyclostyled)

10,050 $\pm$ 110 (10345 $\pm$ 110) B.P.
8395 $\pm$ 110 B.C.

LXIV

Site : SONEGOAN

Lat : 18° 39' N

District : Poona

Long : 74° 05' E

Excavated by the Deccan College Post Graduate and Research Institute, Pune. The mound rises to a height of 5.18 m. and is situated at the confluence of Rivers Karha and Nira. Two occupational periods—chalcolithic and historical were observed.

Period I: The ceramic industry of the period comprised Jorwe ware, burnished grey ware, coarse red and Malwa wares. The first was preponderant while the last was less frequent. Shapes in the Jorwe Ware included spouted pots, globular vessels and carinated bowls. Painted designs were geometrical, antelope and crane motifs. Those in Malwa ware were globular pots with flared mouths and sub-spherical bowls. In grey ware burial urns, knobbed lids, *kundas* and perforated pots with a lot of lime were noticed. Shapes in coarse red ware consisted of storage jars, knobbed lids, dough plates, rectangular bowls on-stand, etc.

Microliths in chalcedony were represented by lunates, penknife blades, trapezes, parallel-sided blades and fluted cores. Types in ground stone industry comprised of Chisels and celts of dolerite and granite. Other stone objects were querns, pounders, maceheads and rubber stones. No copper was found.

Three structural phases called A, B and C were encountered.

In the first phase which started right on the black cotton soil, lime flooring with Post-holes and circular pits with varying diameters (1.2–3.7 m.) were found. In the second phase floorings were of lime as also of rammed brown clay. Urn burials of children recalled those at Nevasa and Chandoli. In this phase ground stone tools and querns were found.

The third phase revealed extensive remains of structures over an area of about 11 x 6 m. The area was littered with clods of burnt clay with bamboo impressions. Charred wheat was found for the first time here in the post-Harappan Deccan chalcolithic culture.

Period II: This period was represented by 3.65 m. thick deposit. Pottery consisted of black-and-red ware of the early Christian centuries, slipped and coarse red ware, etc., of the historical period. Remains of a structure with rubble and clay foundation were also met with.

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- (1) TF-384 Jorwe Culture, Period I
Charcoal
Mound II, layer 7, depth 4.2 m.
Field no. 321.
Current Science, 38, 1, 1969, pp. 4–6 and
Radiocarbon, 10, 1968, pp. 131–43.

3415 $\pm$ 105 (3515 $\pm$ 110) B.P.
1465 $\pm$ 110 B.C.

- (2) TF-380 Jorwe Culture, Period I
Charcoal
Mound II, layer 4, depth 1.8 m.
Field no. 120
Current Science, 38, 1, 1969, pp. 4-6 and
Radiocarbon, 10, 1968, pp. 131-143.
 3230 ± 105 (3325 $\pm$ 110) B.P.
 1375 ± 110 B.C.
- (3) TF-382 Jorwe Culture, Period I
Charred wheat
Mound II, layer 5, depth 2.2 m.
Field no. 136
Current Science, 38, 1, 1969, pp. 4-6 and
Radiocarbon, 10, 1968, pp. 131-43
 3195 ± 100 (3290 $\pm$ 100) B.P.
 1340 ± 100 B.C.
- (4) TF-383 Jorwe Culture, Period I
Charcoal from baulk cutting
Field no. 303.
Current Science, 38, 1, 1969, pp. 4-6 and
Radiocarbon, 10, 1968, pp. 131-43.
 3185 ± 100 (3280 $\pm$ 100) B.P.
 1330 ± 100 B.C.
- (5) TF-379 Jorwe Culture, Period I
Charred grain
Mound II, layer 2 B, depth 1.2 m.
Field no. 69
Current Science, 38, 1, 1969, pp. 4-6 and
Radiocarbon, 10, 1968, 131-43
 3150 ± 90 (3240 $\pm$ 95) B.P.
 1290 ± 95 B.C.

LXV

Site : SONKH

Lat : 27°29' N

District : Mathura

Long : 77°31' E

State : Uttar Pradesh

Excavated by Dr. H. Haertel of the Berlin Museum of Indian Art.

The mound is located to the north of the village.

During the excavation thirteen phases were encountered; phase I to V on the northern half of the trench and VI to XIII in the citadel elevation were observed.

Phase I was on the natural soil. No structural remains were encountered. A small ditch, east-west oriented, was found crossing at the bottom cut. From here

P.G. Ware, black-and-red ware, plain coarse grey and red ware formed the ceramics from the ditch. In the upper levels lumps of iron slags, stone balls, round cakes, whorls and bangles of terracotta were found. Besides brown polished sherds of pottery were also found.

Phase II is distinguished by the appearance of the NBP. The P.G. and the red black-and-red wares were absent. Apart from red ware, coarse grey and black slipped wares were observed; the last was predominant. Shapes included dish, plate, bowl, etc. Other finds were a broken Mauryan terracotta of mothergoddess and a rectangular uninscribed copper cast coin.

Phase IIA : Ceramics included a coarse grey, black slipped ware and a distinguishable red ware. Shapes were dishes, plates and bowls. Other antiquities were two terracotta sheep's head, and bull; beads of carnelian and semi-precious stones, a gold leaf ornament with concentric circles, a big bronze plate unusual in size with handles, etc. The phase is datable to 2nd century B.C.

Phase IV : This phase revealed the oldest (earliest) structures in the excavated trenches. Floors comprised brick layers, two triangular drains, one upper and the other lower separated by a brick pavement.

Phase V is mainly distinguished by the size of the bricks 50 x 26 mm.

Phase VI revealed two parallel walls separated by a gap of 1 m. and connected by a cross wall. The intervening space is filled up with sandy ash. This is perhaps part of a gateway. A damaged perforated Kushan relief was also found.

Phase VII was observed in the citadel area on the slope. An oblique wall running east-west leading to an entrance perhaps forming part of the rampart was noticed. Three other walls revealing no picture were encountered.

Pottery consisted of a red ware with stamped *svastika*, *nandyavarta*, *hamsa*, and lotus and other patterns, fragment of a kaolin bowl decorated with creeper lotus designs.

Phase VIII revealed traces of structures robbed for constructing later structures.

Phase IX is separated from the previous by a rubble floor. Evidence of huge conflagration was noticed. Two walls forming part of two rooms round a gateway and a tower on slope belong to this phase.

Finds were a headless drummer of terracotta and jar with *nandyavarta* decoration. This phase is assignable to late Kushan period.

Phase X : In a short span of time rectangular structures were added to those of the previous phase. After this the site was deserted for about 1000 years.

Phase XI is marked by the remains of round entrance tower, a gateway with connecting walls to the west, later on, burnt brick walls, perhaps foundation for a later mud-brick fortification of Jat Hati Singh of the 18th century.

Phase XII is distinguished by a still younger mud-brick wall.

Phase XIII represents the uppermost structures.

TF-927 Early historic
Charcoal

1975 $\pm$ 95 (2030 $\pm$ 95) B.P.
80 $\pm$ 95 B.C.

Probe I, Qdt., E/19, depth 11.60 m.

Indian Archaeology 1969-70-A *Review* pp. 63-69.

LXVI

Site : SONPUR

Lat : 24°58' N

District : Gaya

Long : 84°57' E

State : Bihar

Excavated by the K.P. Jayaswal Research Institute, Patna.

The mound is situated 3 miles (3.2 km.) west of Bela Railway station on the bank of Jamuna river. The occupational deposit of 10 feet (3.04 m.) overlies a sandy deposit. The cultural sequence has been divided into three periods with two subdivisions in the first.

Period I A : Ceramic contents consisted of a coarse black-and-red, red and black wares. The pots were handmade and wheel-turned. Shapes were bowls and vases.

Other finds included styluses of bone and a copper wire.

Structures were huts built of perishable materials viz., reeds or leaves plastered over with mud;

Period I B : Fine black-red ware, red and black wares were the pottery of the period. Shapes included bowls, vases, large urns in red/buff ware with bones inside. Dish in black-and-red appeared for the first time.

Beads of terracotta and stone and arrow-heads of bone were other finds.

Charred rice in large quantities was found in the debris of a burnt storage jar.

Burial was post-cremation in character. The burial pit was 6 feet. (1.82 m.) in diameter and $2\frac{1}{2}$ feet (0.76 m.) deep and contained ash, bone pieces including those of animals and birds and pottery, coarse red black and black-and-red wares.

Period II is marked by the occurrence of the NBP in silver and golden shades with new shapes. Fine black-and-red and black wares are the characteristic ceramics of this period. Noteworthy shapes in the NBP are corrugated and carinated deep bowls. Painted designs in white pigment were noticed in red and black wares.

Other antiquities included beads of terracotta stone and glass; terracotta figurines of birds, *nagas*, and that of a figurine with an interesting headdress and an elegant skirt; lance, spear-head, arrow-head, dagger etc., of iron, bone styluses, socketed arrow-heads of ivory and horn and copper ornaments. Interesting was the find of the crystal human face with horizontal perforation on the head indicating its use as a pendant. A dozen and a half polished stone axes were also found.

Traces of mud-wall evidenced structural activities.

Period III : This is marked by the disappearance of the NBP and black-and-red ware. Generally the pottery is medium to coarse in fabric and included sprinklers in upper levels. Other finds included terracotta birds, toy-carts, chariots, weights, human and animal figurines, bangles etc., copper antimony rods; and iron objects.

Structures of baked bricks (brick size 43 x 3 x 7 cms.) were encountered.

Occupation at the site might have begun in the first quarter of the 1st millennium B.C. and come to a close by the beginning of the Christian era.

TF-376 Period I B
Charred rice
Trench, SPR-XII, pit sealed by layer 9,
depth 4.55 m.
Radiocarbon, 8, 1966, pp. 442-52.

2510 $\pm$ 105 (2588 $\pm$ 105) B.P.
635 $\pm$ 105 B.C.

LXVII

Site : T. Narsipur

Lat : 12°13' N

District : Mysore

Long : 76°55' E

Excavated by the Department of Archaeology, Government of Mysore.

The site is located on the left bank of the Cauvery. In the site natural soil is reached at an average depth of seven feet. (2.13 m.)

Two periods, neolithic and megalithic, were observed.

Period I : Ceramic contents were typical of the neolithic, viz., thick and thin burnished grey, and burnished orange-red or brown wares. Some of the orange-red sherds bore curved lines in violet pigment. The lips of the thin burnished grey ware bore paintings in red ochre. Some of the grey ware vessels were decorated with incised patterns. Painted designs on coarse grey ware comprised simple cross, straight or oblique lines and herring-bone patterns. Among the shapes of particular interest are the channel spouted vessels and lipped bowls in coarse grey ware.

Microlith was represented by a fluted core.

Neolithic tools consisted of polished stone axes, and pounders, etc.

Copper was absent.

The dead were buried in pits with hands placed one above the other on the abdomen. Orientation was east-west. In one burial by the side of the head two hand made pots of cream colour, a channel spouted bowl and on the right side, neck rest were also found.

Period II was the full fledged iron using megalithic culture with the typical Black-and-red, black polished, black, red polished and dull red Wares. The black and red pottery bore graffiti marks.

Iron objects were daggers, etc.

No definite occupational deposit was found over this period.

- (1) TF-412 Neolithic, Period I
Charcoal
Trench TN-24A, A-B, layer 6,
depth 1.6 m.
Sample no. 1, 1965
Current Science, 35, 23, 1966, pp. 585-86 and
Radiocarbon, 10, 1968, pp. 131-43.

3645 $\pm$ 105 (3755 $\pm$ 110) B.P.
1805 $\pm$ 110 B.C.

- (2) TF-413 Neolithic, Period I 3345 $\pm$ 105 (3445 $\pm$ 110) B.P.
1495 $\pm$ 110 B.C.
Charcoal
Trench TN 24 A, C-D, pit IV
sealed by layer 6 (?), depth 1.77 m.
Sample no. 2, 1965
Current Science, 35, 23, 1966. pp. 585-86 and
Radiocarbon, 10, 1968, pp. 131-43.
- (3) TF-414 Megalithic, (?) Period II 220 $\pm$ 90 (225 $\pm$ 90) B.P.
1625 $\pm$ 90 A.D.
Charcoal
Trench TN 24A, C-D, layer 3A,
depth 0.67 m.
Field no. 3
Current Science, 35, 23, 1966, pp. 585-86 and
Radiocarbon, 10, 1968, pp. 131-43.

Date of TF-414 has to be discarded.

LXVIII

Site : TAKALGHAT

Lat : 20° 55' N

District : Nagpur

Long : 78° 57' E

State : Maharashtra

The site was excavated by the Nagpur University, Nagpur.

It is a single culture site with a habitational accumulation of 8 metres.

Ceramic contents of the site included painted pottery, black and red ware, a coarse red ware and a micaceous red ware. The painted pottery is essentially a red ware with an ill-baked core and a thick red slip. The painted designs were entirely geometrical patterns on the globular pots, lid-cum-dishes, basins and storage jars. The pigment used was dull black colour. The black-and-red ware had burnished surface, thin sides, the core was dull black in colour. Rimless bowls were the dominant shape in this ware. A few sherds bore graffiti as well. The micaceous red ware revealed the profuse use of mica chips in the making of the vessels. Shapes found in this variety were globular pots with funnel shaped mouths, dough plates and shallow lids.

Other finds from this site were spears and drills of iron; beads of carnelian and agate both etched and unetched, and fragmentary pieces of copper.

Six floor levels were encountered. Floors were made up with a thick bedding of black clay overlaid with yellow clay and lime.

- (1) TF-783 Paunar I complex
Charcoal
Trench TKG I, layer 9A,
depth 4.78 m.
Field no. TKG-215
Radiocarbon, 11, 2, 1969, pp. 502-508 and
Indian Archaeology 1968-69-A Review pp. 71-73
2495 $\pm$ 100 (2565 $\pm$ 105) B.P.
615 $\pm$ 105 B.C.
- (2) TF-784 Painted Pottery level
Charcoal
Trench TKG-1, III'-IV', layer 7A,
depth 3.03 m.
Field no. TKG, 216.
Indian Archaeology 1967-68-A Review pp. 69-72.
and *Radiocarbon*, 11, 2, 1969, pp. 502-508.
2432 $\pm$ 98 (2505 $\pm$ 100) B.P.
555 $\pm$ 100 B.C.

LXIX

Site : TEKKALAKOTTA

Lat : 15° 32' N

District : Bellary

Long : 76° 53' E

State : Mysore

Excavated by Dr. M.S. Nagaraja Rao.

The cultural debris can be assigned to neolithic, chalcolithic and early historical periods.

Period I pertaining to neolithic is distinguished by the occurrence of grey (including the pale grey), burnished grey - both plain and painted in ochre - brown and buff wares. Pottery is handmade. Shapes represented were spouted vessels, globular vases with funnel shaped rims, bowls with plain and pinched lips, goblets, etc.

Other objects found in this level are polished stone axes, blades of chert, haecedony and opal, beads of steatite and other semi-precious stones, bone-tools, ear ornaments or pendants of gold and a single copper axe.

Burials were fractional - skull and long bones being preferred for interment - with no attendant furnishings.

The earliest settlers preferred castellated hills. Habitational vestiges were noted by post-holes disposed in a circular manner.

In period II the ochre painted pottery is absent while the pale grey ware of the previous period occurs in diminishing frequency. In this level new ceramics viz., a dull red, black-and-red and black-on-red appear. In the last ware one specimen bearing white painted design also occurred. All pottery excepting the black-and-red which was in all probability turned on a slow wheel, was handmade. Common shapes were globular vessels, bowls with and without spouts, spouted pots, jars, urns, bowls with multiple pinched lips and perforated vases. In this period more copper objects mainly rings and wires were available.

Other objects were beads, ground stone axes and microliths. Stone tools comprised edge tools, points, rubbers, grinders, hammers, pounders etc. Material used were igneous and metamorphic rocks. Microliths were fashioned out of sileaceous rocks and exhibited use marks and retouch. Tool-types comprised fluted cores, parallel-sided blades, plunging flakes, straight blunted backed blades, penknife blades, lunates, triangles, trapezes, saw-flakes, scrapers, crested guided ridges, points, etc.

Houses were circular on plan with plastered bamboo screens. Floors were lime plastered. Residences were provided with storage bins. Charred grains identified as horse gram were also found.

Extended inhumation was the normal mode of disposal of the dead. But children were either interred in urns or buried under the floors of houses.

Study of the skeletal remains revealed a population of medium to tall and sturdy stature with a large cranial capacity. It also revealed a Mediterranean and Proto-Australoid admixture. Further there appears a morphological similarity between Tekkalakotta remains and those from Brahmagiri, Nevasa and Chandoli.

In one trench at Gaudramule (TKT-3) later accumulation showed the occurrence of Russet Coated Ware and megalithic Black-and-red wares.

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| (1) | TF-266 Neolithic, Period I
Charcoal
TKT-II, Trench 2, layer 2,
depth 0.17 m.
Field no. 265
<i>Current Science</i> , 34, 13, 1965, pp. 394-97 and
<i>Radiocarbon</i> , 8, 1966, pp. 442-52. | 3625 $\pm$ 100 (3730 $\pm$ 105) B.P.
1780 $\pm$ 105 B.C. |
| (2) | TF-237 Neolithic Period I
Charcoal | 3465 $\pm$ 105 (3562 $\pm$ 110) B.P.
1615 $\pm$ 110 B.C. |

- TKT-1, Trench 1, layer 4,
depth 1-m.
Current Science, 34, 13, 1965, pp. 394-97 and
Radiocarbon, 8, 1966, pp. 442-52.
- (3) TF-262 Neolithic, Period I
Charcoal
TKT-1, Trench 9, layer 1,
depth 0.25 m.
Current Science, 34, 13, 1965, pp. 394-97
and *Radiocarbon*, 8, 1966, pp. 442-52.
- (4) TF-239 Neolithic, Period I
Charcoal
TKT I. Trench 1, pit 4 sealed by
layer 4, depth 1.3 m.
Current Science, 34, 13, 1965, pp. 394-97
and *Radiocarbon*, 8, 1966, pp. 442-52
- (5) TF-227
Charred grains
Trench A, TKT-GWD,
layer 2 ash pit
depth 0.3 m.
Current Science, 34, 13, 1965, pp. 394-97.

LXX

Site : TER

Lat : 18°19' N

District : Osmanabad

Long : 76°09' E

State : Maharashtra

Excavated by the Director of Archives and Museums, Government of Maharashtra.

This is a single culture site where the occupation began from Pre-Mauryan times and continued till the Gupta period.

Ceramic contents were the Northern Black Polished, black-and-red and red polished wares.

Other antiquities were lamps, arrow and spear-heads and knife blades of iron; beads and points of bone; bangles of terracotta, shell, glass and stone, ear-rings of terracotta, Roman clay bullae; and beads of carnelian, agate, lapis lazuli and shell. Numerous terracottas both human and animal cast in double moulds were also found. A number of copper coins were also discovered.

No domestic structures were encountered. However, floors were either of undressed stones and loose brown mud or pounded hemp and lime applied on the black soil.

An important discovery was the remains of large brick *stupa* with eight circular ribs and eight spokes, four *ayaka* platforms and a *pradakshinapatha*. This, on the basis of epigraphs and a coin of Pulumavi, can be dated the first half of the 2nd century. A.D.

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| <p>(1) TF-747 Historical
Charcoal
layer 22, Reg. no. 5/573
<i>Current Science</i>, 38, 11, 1969, pp. 259-60,
<i>Radiocarbon</i>, 11, 2, 1969, pp. 502-508 and
<i>Indian Archaeology</i> 1967-68-A <i>Review</i>, pp. 69-72.</p> | <p>2045$\pm$100 (2105$\pm$110) B.P.
155$\pm$100 B.C.</p> |
| <p>(2) TF-746 Historical
Charocal
layer 3, Reg. no. 5/619
<i>Current Science</i>, 38, 11, 1969, pp. 259-60,
<i>Radiocarbon</i>, 11, 2, 1969, pp. 502-508 and
<i>Indian Archaeology</i>, 1967-68-A <i>Review</i>, pp. 69-72.</p> | <p>1645$\pm$100 (1690$\pm$105) B.P.
860$\pm$105 A.D.</p> |

LXXI

Site : TERDAL

Lat : 15°59'30" N

District : Bijapur

Long : 75°05' E

State : Mysore

Excavated by Shri A. Sundara.

Two megalithic burials, one each of the types found at Halingali were tackled.

Megalith I was a circular cist with passage on the south and three pillars inside supporting the cap-stone. The monument was surrounded by a circle and rectangle

and the whole was covered by cairn heap. Megalithic black-and-red ware and a few human bones with in a broken red ware pot were the contents.

Megalith II – a Greek cross-type was surrounded by a rectangle. It did not have any pillars. Contents were a large number of potsherds of red and black-and-red wares and human skeletal remains.

The habitation area with 0.65 m. thick deposit, about 2 km. away from the burials brought to light microliths viz., fluted cores, flakes with crested guiding ridge, parallel-sided blades; black painted red (two of them being of the Savalda type) and white painted grey wares.

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| <p>(1) TF-684 Neolithic
Charcoal
Trench 1, layer 2, depth 0.17–0.25 m.
Field no. 21.
<i>Current Science</i>, 36, 21, 1967, pp. 566–68,
<i>Radiocarbon</i>, 11, 1969, pp. 188–93 and
<i>Indian Archaeology 1967–68—A Review</i>, pp. 69–72.</p> | <p>3775 ± 95 (3885 ± 100) B.P.
1935 ± 100 B.C.</p> |
| <p>(2) TF-683 Neolithic
Charcoal
Trench 1, layer 3, depth 0.45 m.
Field no. 40
<i>Current Science</i>, 36, 21, 1967, pp. 566–68,
<i>Radiocarbon</i>, 11, 1, 1969, pp. 188–93 and
<i>Indian Archaeology 1967–68—A Review</i>, pp. 69–72.</p> | <p>3615 ± 120 (3720 ± 120) B.P.
1770 ± 120 B.C.</p> |

LXXII

Site : TRIPURI

Lat : 23°08' N

District : Jabalpur

Long : 79°50' E

State : Madhya Pradesh

Excavated jointly by the Department of Archaeology, Government of Madhya-Pradesh, Deccan College Post Graduate and Research Institute, Pune and the Department of Ancient History and Archaeology, Universities of Baroda and Sagar. Earlier excavation was by the Sagar University.

Four periods were distinguished encompassing a time gap from 500 B.C. to 400 A.D.

Period I : Ceramic contents of this period were black-and-red ware, Northern Black Polished and the white slipped wares.

Houses were of mud, with mud-walls and thatched roofs. Floors were plastered over with lime.

Period II : Pottery of the earlier period continued and in addition a fine red ware appeared. Small soapstone objects, decorated grinding stones, bone points constitute minor antiquities. Coins bearing the legend *Tri-pu-ri* in Brahmi, on one side were minted in this period.

Houses were of mud as well as baked bricks, roofed with terracotta tiles fixed to wooden beams by means of iron nails. Soak pits and ring wells were also found.

Period III : This period is distinguished mainly on the evidence of coins.

Ceramics consisted of Red Polished, kaolin Ware and stamped pottery. The sprinkler was the typical shape in the Red Polished Ware. Copper and lead or potin coins belonging to the Satavahanas, Kshatrapas took the place of the Tripuri coins. Several rare coins of the Satavahanas were discovered indicating their overlordship over the area.

Brick structures, ring-wells bear evidence of building activities.

Period IV : is characterised by the presence of socketed arrow-heads, spear-heads and lance-heads of iron. One spear-head had denticulated brass ribs on its socket. The use of brass and denticulation are rare features in such an early period (c. 4th cent. A.D.). Relics of the Kalachuri period were discovered. Coins of Siva, Vasu and Bodhi were found. Another name of the Bodhi dynasty, Chandra Bodhi on a sealing was found. This bodhi dynasty of Tripuri who called themselves Maharajas was recognised for the first time. Gold and silver coins of the Indo-Sassanians and Kalachuris were also discovered.

TF-681 Early Historical Period I
Charcoal

2155 $\pm$ 100 (2220 $\pm$ 105) B.P.
270 $\pm$ 105 B.C.

Trench II, layer 5, depth 2.8 m.
Field no. 246

Current Science, 38, 11, 1969, pp. 259-60,

Radiocarbon, 11, 1, 1969, pp. 188-93 and

Indian Archaeology 1967-68-A Review. pp. 69-72.

LXXIII

Site : UJJAIN

Lat : 23°11' N

District : Ujjain

Long : 75°46' E

State : Madhya Pradesh

Excavated by the Archaeological Survey of India.

Total habitation deposit at the site was about 35 to 40 feet, (10.67–12.1 m.) divisible into four cultural periods.

Period I : Pottery of the period consisted of a double slipped ware with thin black evanescent slip or wash on a red base; coarse, gritty, black slipped vesiculated and black-and-red wares.

Minor antiquities comprised spear, arrow-heads and knives of iron; terracotta beads and spindle whorls, bone styluses and beads of semi-precious stones. A number of unfinished beads, sand stone grinding slabs with grooves and associated deep channel ovens would perhaps testify to the fact that bead making was a major industry.

A mud fortification 245 feet (74.3 m.) and 152 feet (46.3 m.) at the base and top respectively belonged to this period. The shape was a polygon. On the western side, where the river was eroding the rampart the fortification was strengthened by laying sleepers and logs in an intricate manner. Several openings/breeches in the fortification wall suggested entrances. On the north-eastern periphery through a major entrance were encountered several successive roads of different periods. The roads were made up of a veneer of gravel of assorted size over a well-rammed and cambered soling of clay.

Period II : The NBP and its associated wares appeared in this period. Besides, the vesiculated ware continued in limited quantity. Black-and-red and black slipped wares, however, continued. The NBP seems to have been manufactured locally.

Other finds included hairpins, needles, mirror handles, combs and dice of ivory; arrow-heads, pendants of the shape of human beings, double-pointed styluses, cylindrical caskets of bone, antimony rods of copper, bangles of shell and terracotta; beads of ivory and semi-precious stones and glass besides one of gold in humanshape; ear-ornaments of terracotta, copper, glass, and semi-precious stones; arrow-and spear heads, chisels, knives, daggers and sickles of iron; terracotta figurines, both human and animal including mother-goddesses, cones, balls and flesh rubbers and saddle querns and pestles of stone.

Three ivory seals bearing legends in Brahmi character *gothajasa tisakasa* (3rd–2nd cen .B.C.), *Gosaitakasa* and *Pallilasa* are worth mentioning.

Terracotta ring-wells , tile-roofed mud houses were the building activities.

Period III is of long duration from the Sunga period to the Paramaras. Pottery consisted of unslipped ware, moulded pottery and those with stamped designs.

Minor antiquities of the earlier period continued in this period as well. Besides, votive tanks, hair-scratchers of terracotta and stone dabbers were also found.

Seals with legends *Nagabudhisa pravajitasa* and *Asadevasa* in characters of Brahmi assignable to 1st century A.D. were discovered. A coin mould with the effigy of Augustus Hadrianus came from this level.

Period IV : Pottery of this period consisted of a unslipped red, dull grey and mica dusted Wares. Besides, Muslim coins and soapstone beads formed the minor antiquities.

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| <p>(1) TF-409 Early historical, Period II
Charcoal
Locus: IV-V, layer 28,
depth 5.50 m.
Field no. UJN 28/155
<i>Current Science</i>, 38, 11, 1969,, pp. 259–60,
<i>Radiocarbon</i>, 11, 1, 1969, pp. 188–93 and
<i>Indian Archaeology</i>,–1967–68–<i>A Review</i> pp. 69–72.</p> | <p>2335+95 (2400±95) B.P.
450±95 B.C.</p> |
| <p>(2) TF-407 Early historical, Period III
Charcoal
Locus: 0–1, layer 23, depth 4.4 m. ..
Field no. UJN 17 Extn/108.
<i>Current Science</i>, 38, 11, 1969, pp. 259–60,
<i>Radiocarbon</i>, 11, 1, 1969, pp. 188–93
<i>Indian Archaeology</i>, 1967–68–<i>A Review</i>. pp. 69–72.</p> | <p>1900+100 (2050±100) B.P.
100±100 B.C.</p> |

LXXIV

Site : UTNOOR

Lat : 16°40' N

District : Mahbubnagar

Long : 77°38' E

Excavated by F.R. Allchin of the School of Oriental and African Studies (at present in Churchill College, Cambridge).

The village is located on the eastern part of the Raichur *Doab*, 23 miles, (37 km.) south-east of Raichur and seven miles (11-2 km.) north of the Tungabhadra.

Five periods with sub phases in periods I and III were observed.

Period IA is represented by some fragmentary potsherds and a small cattle pen. Pieces of charcoal and animal bones were also found.

Period IB : Evidence of burning seen in all other periods is absent here indicating perhaps a cleaning operation. The pen was utilized. From the strata inside the pen charocal samples were dated by the C14 method.

Period IC marks an important stage in the structural development. The area was levelled up and hardened by trampling and compressing with light brown soil. A double row of post-holes indicated a stockade inside which were found a thick deposit of ash due to cowdung burnt in *situ*. A pit below ashy deposit contained an infant burial.

Period II : This period again is characterised by a levelling process inside the earlier pen with yellow soil, two inches (5 cm.) in thickness. Two structural phases, a new single stockade and an outer fence were noticed. The outer fence though not regular generally followed the earlier plan. Ash deposit indicated another phase of cattle occupation. Potsherds, stone tools and bones of cattle were found.

Period III phases A and B : A few new features were noticed. An even surfaced makeup of the ground with a layer of white feckled material was made. A new stockade and an outer embankment 18" (45 cms). high come into being. Post-holes at regular intervals on a new alignment inside the stockade and a second line of post-holes also regular and evenly spaced were found. Yet another similar set, perhaps indicated a verandah or for reinforcing posts. No human habitation was noticed inside the pen. Surface layer showed pitting from cattle hoofs. Outside the stockade in a trench were encountered bones of cattle, potsherds etc. Evidence of extensive burning was also present.

Period IV represented the final levelling in the site, excepting the centre with brownish sticky clay. Along the perimeter a 18" (45 cms.) bund was also found. From the 3' (0.91 m.) thick ash deposit it can be concluded that the site had suffered heavy burning.

Pottery in the neolithic period consisted of a handmade burnished grey, black, buff wares both plain and incised, perforated and rusticated varieties. Besides an ochre painted ware, red, black, brown ochre and chocolate wares in painted and plain

varieties were also available. In Periods I to III handmade ware continued. In period IV, red, brown, black, ochre and chocolate wares are absent. Paintings were executed in purple ochre tinge before firing. Both burnished and roughened surfaces were available. Shapes were shallow platters, bowls, jars, narrow necked jars and hollow-footed cups. Other antiquities were cores, blades, backed blades, lunates, flakes, used pieces of chert jasper, chalcedony, etc. The ground stone axes consisting of a small assemblage were generally of the Piklihal and Bellary complex and lack the fineness. The materials used are grey gneiss and dark brown hornblende schist. Basalt was absent.

Tool-types from the digs are flakes, discoids, ovoids, spheroids, rubbers, querns, pallets, hammers, etc. Surface exploration also yielded axes. A bone tool- a chisel for extracting marrow was also found.

Animals known are the Indian humped cattle, goat, deer, etc.

Period V : After a considerable time of abandonment the early historical period commences. The area of dig was small and the materials obtained were from holes and pits of burrowing animals.

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| <p>(1) BM-54 Neolithic
Charcoal
First occupational deposit in the ashmound
<i>Radiocarbon</i>, 2, 1960. pp. 26-30</p> | <p>4120 ± 150 (4243 ± 155) B.P.
2293 ± 155 B.C.</p> |
| <p>(2) TF-167 Early neolithic
charcoal
Site I, Square E, layer 7,
depth 1.40 m.
<i>Current Science</i>, 33, 9, 1964, pp. 266-69 and
<i>Radiocarbon</i>, 7, 1967, pp. 291-95.</p> | <p>3890 ± 110 (4000 ± 115) B.P.
2050 ± 115 B.C.</p> |
| <p>(3) TF-168 Early neolithic
Charcoal
Site I, Square D, layer 5,
depth 0.75 m.
<i>Current Science</i>, 33, 9, 1964, pp. 266-69 and
<i>Radiocarbon</i>, 7, 1967, pp. 291-95.</p> | <p>3875 ± 110 (3990 ± 115) B.P.
2040 ± 115 B.C.</p> |

RADIOCARBON DATING METHOD

Cosmic radiation discovered by Hess in 1911 is known to affect earth's atmosphere. Products of the primary cosmic rays are the neutrons present in the higher altitudes of the atmosphere. These neutrons increase in number in the higher altitudes upto 40,000 feet beyond which they begin to decrease. The effect of these neutrons on the earth's atmosphere is interesting.

Of the components of the atmosphere viz., nitrogen, oxygen, etc., nitrogen, which is a major component is the most reactive while oxygen is inert. Neutrons soon after their birth lose their energy through collision with the molecules in the air and are absorbed to form radiocarbon through reaction.

The origin of the radiocarbon in the atmosphere can be explained thus: The atoms of C 12 (ordinary carbon of atomic weight 12) present in the air at a height of 5-6 miles burn to form carbondioxide molecules within a few minutes or at the most a few hours since it is known that carbon cannot remain as carbon for long except in the form of carbondioxide. These carbondioxide molecules collide with the neutrons in the atmosphere and become radioactive. This radioactive carbon dioxide mixes freely and quickly with the atmosphere carbondioxide, thus rendering it radioactive. In this way all atmospheric carbondioxide becomes radioactive. The radioactive carbon - C 14 - is an isotope of C 12, ordinary carbon and the ratio between them is constant. Since all plant life live off carbondioxide through photosynthesis and all other beings both carnivorous and herbivorous depend upon plant life to build their body material, all living beings become radioactive.

Besides the atmosphere and the Biosphere i.e., all living plant and animal life, there is yet another area, namely the oceans - hydrosphere - where natural radioactive carbon is being constantly produced. In the vast expanse of the seas where inorganic carbon in the form of dissolved carbondioxide, bicarbonates, and carbonates are present an exchange reaction takes place between the carbondioxide and carbonate ions.

The time for the radioactive carbondioxide in the air to get distributed in this area is not in excess of 500 years. Several observations have been made in this regard and it has been established that the time for the distribution as compared with the life time of radiocarbon is so short that it is possible to conclude that the radiocarbon atoms could travel several times over during its lifetime. Therefore, it has been surmised that the distribution of radiocarbon in the seas would be uniform without any appreciable rise and fall over the area inspite of several factors, viz., the differential depth of the seabed, etc. Thus the carbon 'exchange reservoir' comprises the atmosphere, the biosphere and the hydrosphere.

A pre-condition for radiocarbon dating is the accurate estimate of half-life value of C 14. Scientists after many experiments and observations have postulated

that during the past 5,000 — 10,000 years the intensity of cosmic rays has been essentially constant. Again, assuming that the carbon 'exchange reservoir' has remained constant without much appreciable change over a long period, say 20,000 – 30,000 years, it is postulated that there is at the present a complete balance between radioactive decay and fresh assimilation of new radiocarbon by all materials in the life-cycle.

This would lead to the assumption that in all living beings including plant life, the rate of radiocarbon assimilated through intake of food is equal to the rate of radiocarbon decay in the body. Therefore, it would follow that so long as one lives, this process continues, but once life is extinct the activity of assimilation of fresh radioactive carbon stops and the process of decay alone remains active. Another point proved through experimentation is that the radioactive carbon remains unchanged irrespective of the environmental factors.

The Half-value of the C 14 has been measured several times over. Three methods of measurement viz., (i) counting of solid barium carbonate with thin window counters; (ii) gas counting with carbondisulfide - carbondioxide mixture; and (iii) gas counting with carbondioxide either as a small additive to the standard argon-alcohol gas counter or as carbon dioxide-methane mixture in the proportional counter.

According to Libby, the first method is prone to more errors while the results of the second are not clear in their significance; hence both the methods are of doubtful validity. Therefore, Libby selecting the last method arrived at 5568 ± 30 years as the half-value of C 14 which means that in about 5568 years the radioactivity in the sample would get reduced to half of its original content at the time of its death. Likewise, in about 11,000 years the radioactive content would become one-fourth and so on. But more recent measurements have given more accurate value. Thus the average of three measurements gives a date 5730 ± 40 years for half-value. Since the difference between these two values is slight and unimportant and compared with the corrections necessary for converting radiocarbon age into calendar years the Pullman Radiocarbon Conference decided to retain the older value of Libby. It has also been proved that one percent error in the half-value appears immediately as one percent error in the absolute age of the sample.

It is absolutely essential that the sample to be dated by this method should contain original carbon atoms at the time of its death. Chemical experiments have shown that organic materials are less liable to be affected by direct exchange of carbon atoms than inorganic molecules such as the carbonates. In other words carbon in organic materials, viz., wood, charcoal, flesh, etc., will not absorb carbon atoms from carbonates, bicarbonates etc., in their inorganic materials. Libby has listed in order of preference materials best suited for C14 measurements. They are: (a) charcoal or charred organic materials such as heavily burnt bones, (b) well-preserved wood, (c) grass, cloth and peat, (d) well preserved antler and similar hairy structures and (e) well-preserved

Before actually beginning the measurements of the samples preparation and pre-treatment of the same are necessary. The processes involved are as follows:

(i) Physical cleaning of the sample, i.e., removal of foreign materials such as dirt, rootlets, and other matter which might introduce modern carbon.

(ii) Acid treatment for removal of undesired matter like calcium carbonates, etc., and the residual carbon extracted through filtration process.

(iii) Combusting the organic sample or adding hydrochloric acid in the case of shell for evolving carbondioxide and condensation.

(iv) Purification of the condensed sample for eliminating oxides of nitrogen, sulphur and trace radio-chemical contamination by radon.

(v) Reduction of the purified carbondioxide.

(vi) Reduced material is treated for elimination of hydrocarbons and drying the wet carbon on hot plate on low heat.

(viii) The sample thus prepared is ground to a consistency of the granules of sugar in agate mortar. A small quantity 0.5 gm. is taken to ascertain the percentage of ash. Much care is taken not to allow the sample to be exposed to air longer than necessary. Care is also taken to avoid outside ash getting mixed up. This percentage of ash is required for correction on the count-rate observed since ash reduces the observed specific radioactivity.

The sample thus prepared is ready for measurement. In order to detect the weak activity, extremely sensitive instruments are used. The best suited instrument is the Geiger counter. There are two modes of introducing the prepared sample into the counters. They are (i) in solid state and (ii) in gaseous state; the latter is preferred. Counting is done in a proportional counter with automatic scalers at high pressure so as to isolate radioactive *beta* particles from other outside effects such as cosmic radiation, wall-contamination in the counter, etc.

Other precautions by way of shielding the radiocarbon counter with iron and lead and also by using a screen of counters surrounding the C 14 counters also reduce these undesired effects.

The statistical error in the radioactive measurement is determined by finding out the square root of the total number of counts divided by the minutes during which they occur. This error is indicated as the Standard deviation. It must be borne in mind that no radiocarbon date should be considered independent of this factor.

Apart from statistical consideration there are some fundamental limitations to this method. Recent researches have shown that at least one of the assumptions viz., either the half-value or the constancy of C/14 production and distribution in the 'exchange reservoir' is disputable. This in turn affects the relationship between radiocarbon age and the calendar age. Further the production of C 14 is also affected by the magnetic dipole moment of the earth and by the galactic cosmic ray flux by the sun. Again the C14 content of a sample might be affected through contamination with foreign carbon such as humic acid, roots, etc. In dense forests and near the ground bacterial decomposition of the soil components also affect, though in a small way.

Although many of these errors can be eliminated by various methods such as those mentioned in the preparation of the sample and by using highly effective instruments and by the mass spectrometric measurements still an error of about 100 years cannot altogether be eliminated.

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